# Understanding Emotion Regulation in Eating Disorder Recovery

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## Dedication

This dissertation is dedicated to the study participants, who kindly volunteered their time and shared their life experiences in order to develop a better understanding of recovery from eating disorders.

**Abstract**

Deficits in emotion regulation and heightened negative affect have been observed across eating disorder diagnoses and are hypothesized to contribute to the maintenance of eating psychopathology. However, the extent to which emotion regulation deficits and elevated negative affect continue to persist after the cessation of eating psychopathology remains unclear despite the emergence of several novel treatments that have been designed to target emotion regulation deficits and negative affect in eating disorder populations. The purpose of this study was to determine whether individuals in recovery from eating disorders experience emotion regulation deficits and heightened negative affect compared to those with active eating disorders and those without current or past eating disorders. Participants included 269 individuals with active eating disorders (AED), 58 participants in recovery from eating disorders (RED), and 143 participants without past or present eating disorders (COMP) who completed several online questionnaires. Results indicated that the AED group reported significantly more emotion regulation difficulties and greater negative affect compared to the RED and COMP groups, who did not differ form one another with regard to emotion regulation difficulties and negative affect. These findings support emotion regulation models of eating psychopathology and suggest that emotion regulation deficits and negative affect may improve with recovery from eating disorder psychopathology. Future research should examine facets of emotion regulation and negative affect using longitudinal designs to determine the temporal relationship between improvements in eating disorder psychopathology, emotion regulation, and negative affect in order to inform treatment interventions.

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## Chapter 1: Introduction

Emotions are multifaceted phenomena that enrich our experiences and are instrumental in motivating behavior. Comprised of behavioral, experiential, and physiological features that are elicited in response to salient stimuli (Gross & Jazaieri, 2014), emotions have the potential to facilitate social connectedness, protect us from harm, and enhance memory for certain events (Kensinger, 2007). Disturbances in emotional processes have been increasingly recognized as important in understanding psychopathology, particularly in light of advances in affective science (Gross & Barrett, 2013). By examining the significance of emotions and emotion regulation across a range of symptom clusters, researchers have identified mechanisms contributing to the etiology and maintenance of psychiatric disorders, which in turn have led to novel treatments designed to target emotion-related processes.

Eating disorders are a cluster of psychiatric symptoms that have been traditionally conceptualized by their behavioral (e.g., binge eating, caloric restriction) and cognitive (e.g., overvaluation of shape/weight) features. With some of the highest mortality rates of any psychiatric disorder (see review by Arcelus, Mitchell, Wales, & Nielsen, 2011), eating disorders are serious illnesses that cause psychosocial impairment (Hudson, Hiripi, Pope, & Kessler, 2007) and reduced quality of life (Engel, Adair, Hayas, & Abraham, 2009). Eating disorders are also associated with potentially serious medical complications, including electrolyte abnormalities, reduced bone density, dental erosion (Crow & Swigart, 2005), and metabolic syndrome (Mitchell, 2016). It is necessary to identify factors associated with the onset, maintenance, and treatment of eating disorders to inform prevention and intervention efforts.

Paralleling the broader field of psychopathology research, there has been increased attention to emotional disturbances in eating disorders. Disruptions in emotion-related processes have been found to contribute to the onset and maintenance of eating disorder symptoms, including binge eating and purging (Stice, Marti, & Durant, 2011; Wonderlich et al., 2008). Maintenance models of eating pathology that implicate emotion regulation as a central function of disordered eating behaviors have served as catalysts for interventions targeting emotion dysregulation, which encompasses a range of factors involved in the experience, identification, and modulation of emotions. Some of these treatments are quite promising given reductions in disordered eating and associated symptoms found in randomized clinical trials (e.g., Wonderlich et al., 2014). However, the extent to which these interventions alter a number of factors involved in emotion regulation is less clear, especially over an extended period of time (e.g., years into recovery from an eating disorder). Furthermore, despite the perniciousness of eating disorders, less than half of individuals with these conditions seek treatment (Hudson et al., 2007) and, among those who do, a large minority do not fully recover (Wilson, Grilo, & Vitousek, 2007). Yet many experience symptom remission or symptom reduction over time regardless of treatment or no known treatment (American Psychiatric Association [APA], 2013; Fairburn, Cooper, Doll, Norman, & O'Connor, 2000; Keski-Rahkonen et al., 2007). Recovery from eating disorders is possible, although exactly what this entails is less clear.

Despite the relevance of emotion-related processes to the onset and maintenance of disordered eating, emotion-related processes remain poorly understood among individuals in eating disorder recovery. The implications of understanding variables such

as emotion regulation and negative affect in eating disorder recovery are numerous. First, there is an implicit assumption that the cessation of eating disorder symptomology is associated with improved emotion regulation, provided that other maladaptive coping (e.g., substance abuse) does not emerge in place of disordered eating. Establishing whether individuals in eating disorder recovery do, in fact, have better emotion regulation relative to those with active eating disorders can shed light on this issue. Second, existing emotion-focused eating disorder treatments target emotion regulation deficits from a number of directions. For example, in Integrative Cognitive Affective Therapy for Bulimia Nervosa (Wonderlich, Peterson, & Smith, 2015), individuals are not only taught to experience and label their emotions, they are also instructed to alter behaviors in response to emotions (e.g., one might try calling a friend when anxious instead of binge eating). Studying emotion regulation in eating disorder recovery may elucidate specific facets of emotion regulation that are more central to recovery than others. Conversely, one might also learn that deficits in emotion regulation continue to be impaired in eating disorder recovery, especially among individuals not traditionally included in randomized control trials testing manual-based interventions. This information could result in treatment modifications that further emphasize components of emotion regulation. A third advantage is that by comparing emotion regulation between those with active eating disorders versus those in eating disorder recovery, one could establish whether facets of emotion regulation serve as useful markers of remission from eating disorders.

**Purpose of the Present Study**

The relative paucity of research on emotion regulation in eating disorder recovery, coupled with mixed findings, inconsistent methodology (e.g., studies have used different

criteria to define eating disorder recovery; Bardone-Cone et al., 2010), and sample limitations, precludes any firm conclusions as to whether facets of emotion regulation are impaired in eating disorder recovery. To this writer's knowledge, there are no published studies that have comprehensively examined facets of emotion regulation in a heterogeneous group of individuals in eating disorder recovery, especially outside of treatment-outcome studies, which can be limited in their generalizability. Establishing the extent to which emotion regulation deficits differ between those with active eating disorders versus those in eating disorder recovery that are more broadly representative of the eating disorder population is critical to informing prevention and intervention efforts. The following research questions and hypotheses informed the current study, which investigated several facets of emotion regulation, as well as negative affect, among individuals in recovery from eating disorders (RED), individuals with active eating disorders (AED), and individuals without eating disorder histories who comprised the comparison group (COMP).

**Research Questions (RQ) and Hypotheses**

**RQ 1.** Emotion regulation deficits have been implicated in the onset and maintenance of eating disorders but are not well-understood among individuals in eating disorder recovery. The primary research question is whether differences in emotion regulation exist between those in eating disorder recovery versus those with active eating disorders versus those without histories of eating disorders.

**$H_0$ 1.1** When controlling for negative affect, which has been associated with emotion regulation difficulties (Tortella-Feliu, Balle, & Sesé, 2010), there are no

significant differences in overall emotion regulation deficits between the RED, AED, and COMP groups.

**$H_0$ 1.2** When controlling for negative affect, there are no significant differences between the RED, AED, and COMP groups on the following facets of emotion regulation: (i) emotional acceptance, (ii) emotional awareness, (iii) emotional clarity, (iv) difficulties engaging in goal-directed behavior when upset, (v) inhibiting impulses when upset, (vi) self-efficacy in effectively regulating emotions when upset, (vii) cognitive reappraisal, and (viii) experiential suppression.

**RQ 2.** Heightened negative affect is characteristic of those with eating disorders, and guilt/shame appears to be a particularly salient affective state that is regulated by eating disorder behavior (Berg et al., 2013; Berg et al., 2015). Previous research has found that lower negative affect is associated with eating disorder recovery (Harney, Fitzsimmons-Craft, Maldonado, & Bardone-Cone, 2014); however, this previous research excluded males and examined negative affect via measures of depression, anxiety, loneliness, and stress as opposed to investigating other facets of negative affect (e.g., fear, guilt/shame, hostility, sadness). Therefore, the second research question of this thesis study was to determine whether the intensity of overall negative affect, as well as specific facets of negative affect, differed between those in eating disorder recovery, those with active eating disorders, and those without eating disorder histories. Because of evidence that women experience more negative affect than men, gender was controlled (Fujita, Diener, & Sandvik, 1991).

**$H_0$ 2.1** When controlling for gender, overall negative affect does not significantly differ between the RED, AED, and COMP groups.

**$H_0$ 2.2** When controlling for gender, facets of negative affect (i.e., fear, hostility, guilt, sadness) do not significantly differ between the RED, AED, and COMP groups.

**Construct Definitions**

**Eating disorders.** Anorexia nervosa (AN), bulimia nervosa (BN), and binge eating disorder (BED) are three primary eating disorder diagnoses that characterize patterns of clinically significant eating disorder psychopathology. These disorders are included in the Feeding and Eating Disorders section of the Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-5; APA, 2013) and are mutually exclusive of one another such that the presence of one precludes the presence of another. It is possible, nonetheless, to meet criteria for multiple disorders assuming they occur at different points in time (e.g., an individual could have a past diagnosis of BN and current diagnosis of BED).

In addition to AN, BN, and BED, there are two residual eating disorder diagnostic categories that capture clinically significant patterns of disordered eating that do not meet criteria for AN, BN, or BED. The Other Specified Feeding or Eating Disorder (OSFED) diagnosis captures subclinical and atypical forms of AN, BN, and BED. Examples of OSFED include cases where all symptoms of AN are met except that the individual is not significantly underweight despite significant weight loss, or cases where all symptoms of BED are met except that binge eating episodes occur less than weekly over a three month period. The second residual category, Unspecified Feeding or Eating Disorder (UFED), is a diagnosis that is appropriate when there is significant eating pathology that does not meet criteria for AN, BN, BED, or OSFED, or in situations where there is insufficient information to make a more specific eating disorder diagnosis (e.g., emergency room

settings). An example of UFED would be if an individual with significant concerns about their shape and weight who has been at a stable, normal weight and does not binge eat or purge, engages in excessive exercise and regular diet pill use (Peterson, Berg, Durkin, & Jappe, 2015).

***Anorexia nervosa.*** According to the DSM-5 (APA, 2013), a diagnosis of AN is given to individuals at a significantly low body weight due to caloric restriction (Criterion A) who fear gaining weight and/or engage in behaviors that interfere with weight gain (Criterion B), and who exhibit a disturbance in their experience of their body weight or shape (Criterion C). Those who meet diagnostic criteria for AN may be subtyped based on the presence (Binge-eating/purging type; AN-BP) or absence (Restricting type; AN-R) of recurrent binge eating or purging. AN severity specifiers, which are a novel addition to DSM-5, are based on body mass index (BMI; $kg/m^2$) for adults and BMI percentiles for children and adolescents: Mild = BMI $\leq$ 17 $kg/m^2$, Moderate = BMI 16-16.99 $kg/m^2$, Severe = BMI 15-15.99 $kg/m^2$, or Extreme = BMI < 15 $kg/m^2$.

***Bulimia nervosa.*** BN is characterized by recurrent episodes of binge eating (i.e., eating large amounts of food in short periods of time in an uncontrolled manner; Criterion A) that are accompanied by the use of inappropriate compensatory behaviors, including self-induced vomiting; misuse of laxatives, diuretics, or other medications (e.g., insulin); or excessive exercise (Criterion B). These episodes must occur at a minimum of once per week over three months (Criterion C), and the individual's weight and shape disproportionately influence their self-evaluation (Criterion D). A diagnosis of BN is appropriate when an individual does not meet full diagnostic criteria for AN (Criterion

E); in other words, if behavioral and cognitive criteria for AN and BN are both met, a diagnosis of AN is given because AN trumps BN in the diagnostic hierarchy due to the additional criteria of being significantly underweight. Severity specifiers for BN are based on the average frequency of compensatory behaviors per week: Mild = one to three episodes, Moderate = four to seven episodes, Severe = eight to 13 episodes, and Extreme = 14 or more episodes.

***Binge eating disorder.*** Whereas BN is defined by binge eating *and* inappropriate compensatory behaviors, BED is a diagnosis that describes those who regularly engage in binge eating (Criterion A) in the absence of regulate of regular compensatory behaviors and experience at least three of the following features in relation to most binge eating episodes (Criterion B): eating much more rapidly than normal; eating until feeling uncomfortably full; eating large amounts of food when not physically hungry; eating alone due to embarrassment over the amount of food consumed; and feeling depressed, guilty, or disgusted with oneself after binge eating episodes. Distress about binge eating must be present (Criterion C), and binge eating episodes must occur, on average, at least weekly over three months (Criterion D). The presence of recurrent compensatory behaviors (e.g., self-induced vomiting) and/or satisfying diagnostic criteria for AN or BN precludes a diagnosis of BED (Criterion E).

***Prevalence.*** In the largest epidemiological survey of eating disorders in the United States (U.S.) to date, Hudson et al. (2007) analyzed data from a nationally representative survey (National Comorbidity Survey Replication; Kessler & Merikangas, 2004) and determined that the lifetime prevalence of AN was 0.9% for adult women and 0.3% for adult men, with most cases beginning in adolescence or young adulthood (mean

age of onset = 18.9 years). The lifetime prevalence of BN was found to be slightly higher, with 1.5% of adult women and 0.5% of adult men meeting criteria for this disorder at some point during their lifespan. Most cases of BN began by late adolescence/early adulthood (mean age of onset = 19.7 years). The mean age of onset for BED was 25.4 years, which was slightly higher than for AN and BN. Binge eating disorder was also more common than AN and BN, with lifetime prevalence estimates of 3.5% for adult women and 2.0% for adult men.

Although eating disorder research has historically centered on young adult women, researchers have increasingly examined eating disorder symptomatology in males (Carlat, Camargo, & Herzog, 1997), older women (e.g., Gagne et al., 2012), sexual minorities (e.g., Feldman & Meyer, 2007), and gender nonconforming populations (e.g., Hepp & Milos, 2002). Certain ethnically diverse populations have also been studied. For example, epidemiological data indicate that the lifetime prevalence of BN in the U.S. is actually higher among Latinos and African Americans compared to non-Latino Whites (Marques et al., 2011). Among adolescents, those identifying as Hispanic have a higher lifetime prevalence of BN than non-Hispanic Whites (Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011). Unfortunately, ethnic minorities are less likely to receive treatment for an eating disorder (Marques et al., 2011). Provider biases may be at least partially to blame, as Becker, Franko, Speck, and Herzog (2003) found that Native American and Latino participants were less likely to be assessed by doctors for eating disorder symptoms, and less likely to be referred for specialized eating disorder assessment and treatment despite comparable eating disorder symptomatology.

***Clinical course.*** The clinical course of eating disorders is highly variable. Most individuals develop AN, BN, or BED as adolescents or young adults, although eating disorders can develop in later adulthood. Those with eating disorders are oftentimes symptomatic for several years, with a subset experiencing a rather chronic course. It is also not uncommon for individuals to vacillate between periods of engagement in eating disorder behaviors (e.g., binge eating, dietary restriction) and more normalized eating patterns, which may be aided by treatment. Less is known about the course of BED versus AN and BN, although it has been suggested that the course of BED is comparable to BN but that BED has higher remission rates than BN and AN (APA, 2013).

Diagnostic migration is not uncommon in eating disorders (Milos, Spindler, Schnyder, & Fairburn, 2005), although estimates are not yet clear. Some have estimated that roughly one-third of those with AN develop BN over time (Eddy et al., 2008) and that approximately 10-15% of those with BN develop AN (APA, 2013). Others have not found evidence of diagnostic crossover in AN (Stice, Marti, & Rohde, 2013). The DSM-5 (APA, 2013) notes the development of AN or BN following BED is rare, although Stice et al. (2013) observed that approximately one-fifth of adolescent females transitioned from BN to BED, or BED to BN, over a five-year period. Discrepant findings may be attributed to use of different diagnostic criteria (i.e., DSM-IV [APA, 1994] versus DSM-5) and/or sample characteristics; therefore, additional prospective studies are needed.

Although individuals with eating disorders can experience symptom remission (45%) or symptom reduction (25%) over time regardless of treatment (Steinhausen, Weber, & Phil, 2009), treatment is necessary for many with eating disorders given the severity and chronicity of the illness. Unfortunately, only a subset of those with eating

disorders receive specialized treatment (Fairburn, Cooper, Doll, Norman, & O'Connor, 2000; Hudson et al., 2007) and, among those who do, a sizeable proportion drop out of treatment prematurely (Fassino, Piero, Tomba, & Abbate-Daga, 2009). Furthermore, some do not improve with treatment or relapse over time (Wilson et al., 2007). Suboptimal success rates have led researchers to identify predictors of good treatment outcome (see Vall & Wade, 2015, for review) and to develop more effective treatments (Berg & Wonderlich, 2013); however, there remains significant room for improvement due to the pernicious nature of these conditions.

***Psychiatric comorbidity.*** Studies of comorbid psychopathology in both clinical and epidemiological samples have consistently found that mood, anxiety, and substance use disorders frequently co-occur with eating disorders (APA, 2013) and can persist well into eating disorder recovery (Steinhausen et al., 2009). Hudson et al. (2007) found that among individuals with lifetime diagnoses of AN, BN, or BED, at least half met lifetime criteria for at least one other DSM-IV-TR (APA, 2000) disorder, with rates highest among BN (94.5%), followed by BED (78.9%) and AN (56.2%). In fact, 33.8 to 64.4% of the sample met criteria for at least three additional disorders at some point in their lives. Across groups, 47.9 to 80.6% of the eating disorder sample had at least one lifetime mood disorder (e.g., major depressive disorder, dysthymia, bipolar disorder), and 42.1 to 70.7% had at least one lifetime anxiety disorder (e.g., specific phobia, social phobia, posttraumatic stress disorder). Lifetime substance use disorders were highest in those with BN (36.8%), followed by AN (27.0%) and BED (23.3%).

***Risk factors.*** Consistent with other mental disorders, risk factors for eating disorders are complex; there is not one pathway to an eating disorder. Rather, several

biological and environmental risk factors have been identified that interact to increase one's risk of developing eating pathology, whether directly or indirectly. In addition to genetic risk factors, childhood obesity and early pubertal onset increase risk for eating disorders, as do histories of sexual or physical abuse, low self-esteem, and symptoms of anxiety and depression (APA, 2013). Traits such as perfectionism and impulsivity are also risk factors (Stice, 2002). Females are significantly more likely to develop eating disorders compared to males (APA, 2013). However, this may be partially because eating disorder symptomatology has historically been under-recognized (Anderson, 1992) and under-treated in males despite similar rates of psychosocial impairment compared to women (Striegel, Bedrosian, Wang, & Schwartz, 2012).

Additional risk factors for eating disorders include perceived pressure to be thin and internalizing the thin-ideal, which collectively leads to body dissatisfaction (Stice & Shaw, 2002), a phenomenon frequently cited as one of the most potent eating disorder risk factors (Stice, 2002). According to a risk factors model developed by Stice et al. (2011), adolescent girls with high levels of body dissatisfaction are nearly four times as likely to develop an eating disorder, and this risk is even greater if depressive symptoms are present. Eating disorder risk is also increased among those without elevated body dissatisfaction: Adolescent girls with lower levels of body dissatisfaction who reported dieting behavior were nearly 3.6 times as likely to develop an eating disorder. Given this, prevention efforts need to target these distinct pathways and, given the presence of mood symptoms and negative affect as precursors to the development of eating pathology, prevention interventions might also focus on emotion regulation.

**Emotion-related terms**. The following sections provide definitions of emotion, affect, emotion regulation, and related constructs.

***Emotion.*** The term emotion is often used synonymously with "feeling," which is a descriptor of one's subjective experience (Scherer, 2013) that is based on observation of thoughts, bodily sensations, and/or behaviors. There is no broad consensus as to what specifically defines an emotion, but research suggests that emotions are comprised of behavioral, experiential, and physiological components that are elicited in response to salient stimuli (Gross & Jazaieri, 2014). Emotions are adaptive, biological phenomena (Tracy, Klonsky, & Proudfit, 2014) that enrich our experiences and are instrumental in motivating behavior. They have the potential to facilitate social connectedness, protect us from harm, and enhance memory for certain events (e.g., Kensinger, 2007). Emotions are relatively short-lived in contrast to one's mood, which can be thought of as "…a pervasive and sustained emotional 'climate'…that colors the perception of the world" (APA, 2013, p. 824).

The studies included in the following literature review did not explicitly define emotion, which is problematic given various interpretations of this term. Given that nearly all studies of emotion relied on participant self-report, this paper makes the assumption that the term emotion is used to denote one's subjective feeling state based on observation of thoughts, bodily sensations, and/or behaviors. It is worth noting here that advancements in neuroimaging have allowed researchers to investigate physiological changes that accompany different emotional states (e.g., Bohon & Stice, 2012), which provides a more comprehensive picture of emotional experience; however, these studies were outside the scope of the current literature review.

***Affect.*** Similar to emotion, definitions of affect have also varied. Whereas some view it synonymously with emotion or with a subjective feeling state (see Gross, 2014), others describe affect as the behavioral manifestation of a subjective feeling state (APA, 2013). Yet others view it as an overarching construct (e.g., Gross, 2014). All of the studies reviewed in this current paper construe affect as synonymous with one's subjective feeling state given the reliance on self-report assessments of affect (e.g., "To what extent are you feeling sad?"); therefore, unless otherwise stated, the term "affect" (and "emotion") are defined as one's subjective feeling state based on observation of thoughts, physical sensations, and/or behaviors.

Two independent dimensions have been proposed to reflect the valence of one's affective experience: positive affect and negative affect. Positive affect refers to "…the extent to which one feels enthusiastic, active, and alert," whereas negative affect describes experiences of "…subjective distress and unpleasant engagement" (Watson, Clark, & Tellegen, 1988b, p. 1063). High negative affect and low positive affect have been associated with anxiety whereas low positive affect has been associated with depression (Watson, Clark, & Carey, 1988a).

***Emotion regulation.*** Emotion regulation can be broadly thought of as the processes that modulate an emotional reaction (Gross, 2014). Although conceptualizations of emotion regulation vary, many believe that, similar to emotion, emotion regulation is a multidimensional construct. In 2004, Gratz and Roemer developed a comprehensive, atheoretical model of emotion regulation based on their review of the literature that informed the development of a now widely used, questionnaire-based assessment of emotion regulation deficits (i.e., Difficulties in

Emotion Regulation Scale [DERS]; Gratz & Roemer, 2004). They defined emotion regulation as involving: 1) awareness and understanding of emotions, 2) acceptance of emotions, 3) the ability to control impulsive behaviors to work toward desired goals when experiencing negative emotions, and 4) the flexible use of situationally appropriate emotion regulation strategies to meet one's goals and situational demands. Difficulties with emotion regulation, emotion regulation deficits, and emotion dysregulation are phrases used synonymously throughout this thesis paper to describe the challenges one experiences with one or more aspects of emotion regulation.

*Cognitive reappraisal*. Cognitive reappraisal is an emotion regulation strategy that involves reinterpreting the meaning of an emotional stimulus in order to modulate one's emotional response (Gross & John, 2003). For example, students may feel less anxious about an upcoming test if they focus on how well they have prepared and acknowledge that anxiety is a feeling that does not last forever. Modifying the meaning of anxiety in the aforementioned example may have a positive impact on how the individual behaves in response to this emotion. Use of cognitive reappraisal has been associated with a number of positive outcomes, including greater self-esteem and life satisfaction, as well as fewer depressive symptoms (Gross, 1998).

*Expressive suppression*. Expressive suppression is an emotion regulation strategy that describes efforts to inhibit emotion-expressive behavior (Gross, 1998). An adolescent female who minimizes feelings of hurt and anger in response to a friend who has cancelled plans with her for the third time is suppressing her expression of these emotions. In contrast to cognitive reappraisal, which is associated with a number of

positive outcomes, engagement in expressive suppression is linked to increased negative affect, depressive symptoms, reduced quality of life, and lower self-esteem (Gross, 1998).

**Overview**

This thesis paper is divided into several chapters that provide background on emotion regulation in eating disorders and details of the thesis study. Chapter 2 contains a review of the literature as it relates to major variables of study, while Chapter 3 focuses on study methodology, which includes recruitment methods, study procedures, assessment measures, and the data analysis plan. Chapter 4 summarizes study results, and Chapter 5 begins with a study summary, followed by a discussion of findings, strengths and limitations of the study, directions for future research, and conclusions. References, appendices, and tables are available at the end of this paper.

# Chapter 2: Literature Review

## Emotion Regulation Deficits in Eating Disorders

Since the 1980s, researchers have studied emotion-related processes in eating disorders using a range of approaches and methodologies. Accumulating evidence indicates that individuals with eating disorders are prone to emotional disturbances. Not only do anxiety, depression, and negative emotionality increase risk for eating disorders, mood and anxiety disorders frequently co-occur among those with eating disorders (APA, 2013). Borderline personality disorder, which has been conceptualized as a disorder of emotion regulation (Linehan, 1993), also co-occurs in a subset of individuals with eating disorders. In addition to emotional disturbances, those with eating disorders experience emotion regulation deficits. Evidence for this assertion is supported by several lines of converging research, including studies of the relationship between emotion regulation deficits and eating disorder behaviors in nonclinical samples; studies of emotion regulation deficits in AN, BN, and BED; and studies examining the relationship between negative affect and engagement in disordered eating behaviors.

Given the extensive literature on emotion dysregulation in eating disorders, as well as the plethora of measures and methodologies used to examine emotion regulation deficits, this review primarily focused on studies that utilized the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), a measure of emotion dysregulation that is ideally suited for use in eating disorder samples given its ease of administration and broad scope. The DERS is a 36-item self-report questionnaire assessing emotion regulation deficits that yields an overall score (i.e., Total score) and the following six subscale scores: 1) non-acceptance of emotional responses (Nonacceptance), 2)

difficulties engaging in goal-direction behavior (Goals), 3) impulse control difficulties (Impulse), 4) lack of emotional awareness (Awareness), 5) limited access to emotion regulation strategies (Strategies), and 6) lack of emotional clarity (Clarity).

**Emotion regulation deficits and eating disorder behaviors in nonclinical samples.** Whiteside et al. (2007) administered the DERS (Gratz & Roemer, 2004) and the Eating Disorder Diagnostic Scale (EDDS; Stice, Telch, & Rizvi, 2000) to 692 (284 men, 411 women) undergraduate psychology students to determine whether emotion regulation difficulties accounted for unique variance in binge eating frequency after controlling for food restriction and overvaluation of shape and weight. Demographic data were not reported with the exception of mean age, which was 18.7 years. Results from the EDDS revealed that 8% of males and 20% of females acknowledged binge eating at least weekly over the past three months, with 75% of these individuals engaging in regular compensatory behaviors (e.g., self-induced vomiting). Emotion regulation difficulties accounted for 6.5% of the variance in binge eating independent of food restriction and overvaluation of shape and weight. Specifically, limited access to emotion regulation strategies (Strategies) and lack of emotional clarity (Clarity) were the two DERS subscales that best predicted binge eating behavior. The relationship between emotion dysregulation and purging was not examined in this study.

In another study of undergraduates, Lavender and Anderson (2010) sought to determine whether emotion regulation difficulties contributed to disordered eating and body dissatisfaction after accounting for body mass index (BMI) and negative affect in males, a group often underrepresented in studies of eating disorder psychopathology. They administered questionnaires to assess emotion regulation deficits (DERS; Gratz &

Roemer, 2004), negative affect (Positive and Negative Affect Scale; PANAS; Watson et al., 1988b), eating disorder psychopathology (Eating Disorder Examination – Questionnaire [EDE-Q]; Fairburn & Beglin, 1994), and body dissatisfaction (Male Body Attitudes Scale; Tylka, Bergeron, & Schwartz, 2005) to 296 men whose mean age was 18.9 years. More than half of participants identified as Caucasian (66.9%; 11.5% identified as African American, 7.8% as Hispanic, 6.8% as Asian, and 7.1% as "other").

Results indicated that when controlling for BMI and negative affect, emotion regulation deficits uniquely accounted for 1.3% of the variance in disordered eating and 1.2% of the variance in body dissatisfaction. When DERS subscales were compared in relation to body dissatisfaction and disordered eating, the Nonacceptance subscale uniquely predicted both disordered eating and body dissatisfaction, while the Strategies subscale uniquely predicted disordered eating.

Both Whiteside et al. (2007) and Lavender and Anderson (2010) found that emotion regulation difficulties were associated with disordered eating in non-clinical college samples and that certain emotion regulation deficits may be particularly relevant to those with eating concerns. Specifically, both studies found that individuals who reported disordered eating were more likely to report limited emotion regulation strategies, which is characterized by the belief that once one is upset there is nothing that can be done (Gratz & Roemer, 2004). There was also evidence, though not consistent between the two studies, that those who tend to have secondary emotions in response to distress (e.g., feeling angry with self for becoming upset; Lavender & Anderson) and those lacking in emotional clarity (Whiteside et al.) were more likely to endorse disordered eating behavior.

The use of large non-clinical samples and a multidimensional measure of emotion regulation are two strengths of the aforementioned studies. The inclusion of males in both studies is notable since this population is often underrepresented in studies of eating disorders. Furthermore, Lavender and Anderson's (2010) sample was more ethnically diverse than any other study of emotion regulation and disordered eating included in this literature review. The sole reliance on self-report measures to assess eating pathology as opposed to interview-based assessments that can more thoroughly examine eating disorder behaviors that are complex in nature (e.g., binge eating) may be considered a limitation due to the risk of over-reporting, since eating disorder self-report questionnaires can yield higher scores for certain behaviors than eating disorder interviews (e.g., Fairburn & Beglin, 1994). With that said, if eating disorder psychopathology was overestimated in these studies due to self-report questionnaires, results would suggest that those with even less eating pathology experience emotion regulation deficits. Taken together, these studies show that emotion dysregulation is associated with binge eating and disordered eating behaviors in non-clinical samples.

**Emotion regulation deficits in AN, BN, and BED.** In a conceptual review article, Lavender et al. (2015) examined studies of AN and BN to consolidate research related to emotion regulation. They concluded that both AN and BN are associated with greater overall emotion dysregulation compared to controls, and reviewed available evidence to answer four questions stemming from Gratz and Roemer's (2004) framework of emotion regulation. These questions are presented below, followed by Lavender et al.'s findings.

1) To what extent is one able to flexibly use adaptive and situationally appropriate strategies to modulate emotional duration/intensity? Lavender et al. noted that individuals with AN have been shown to exhibit deficits in the flexible use of appropriate emotion regulation strategies (e.g., cognitive reappraisal) compared to controls but that evidence for such deficits in BN is inconclusive due to mixed findings. For instance, some have found decreased use of cognitive reappraisal in BN (e.g., Danner, Sternheim, & Evers, 2014) whereas others have not (e.g., Davies, Schmidt, Stahl, Tchanturia, 2011).

2) How well is one able to inhibit impulses and remain goal-directed when distressed? Several studies reviewed by Lavender et al. (2015) found that those with AN and BN have significant impairments in this domain when assessed using self-report measures such as the DERS (Gratz & Roemer; 2004). Additionally, those with AN-BP may be even more impulsive when distressed than those with AN-R (e.g., Brockmeyer et al., 2014).

3) What is one's level of emotional awareness, clarity, and acceptance? To assess these dimensions of emotion regulation, Lavender et al. (2015) examined several related constructs. Alexithymia, which includes difficulty identifying feelings, differentiating between feelings and bodily sensations, communicating feelings, and having an externally focused cognitive style (Sifneos, 1973), has been observed in both AN and BN relative to controls, although Lavender et al. point out that it is unclear whether alexithymia in these disorders can be attributed to the presence of comorbid mood and anxiety disorders as opposed to core eating disorder psychopathology. Both AN and BN are associated with less emotional awareness versus controls, and there appears to be no significant differences in lack of emotional awareness between AN subtypes. Whereas

studies of AN have frequently found deficits in the ability to decipher emotions in others in both subtypes, available research indicates that individuals with BN do not appear to have these difficulties; however, more research is needed. Accumulating evidence indicates that both AN and BN engage in more avoidance of emotions, suppression of emotions, and non-acceptance of emotions versus controls. According to Lavender et al., there is no evidence that emotional suppression and non-acceptance of emotions differ between AN-R and AN-BP.

4) How much is one willing to experience emotional distress to pursue meaningful activities? To answer this question, the authors examined studies that assessed the degree to which AN and BN avoid emotion-inducing stimuli compared to controls. While some studies do indicate those with eating disorders tend to avoid emotion-eliciting situations, more research is needed to support this finding. Additional support for this fourth dimension comes from studies showing that both AN and BN have elevated harm avoidance, which means they are more likely to inhibit behavior in the face of punishment and non-reward (Clonginger, 1994), and exhibit heightened sensitivity to punishment versus controls.

Collectively, Lavender et al. found that both AN and BN are associated with a broad range of emotion regulation deficits relative to control participants, and that certain emotion regulation strategies, such as emotional impulsivity, are more impaired in AN-BP versus AN-R. However, more research is needed to clarify the nature of emotion regulation deficits between AN and BN, as well as AN subtypes.

Although there are fewer studies of emotion dysregulation in BED compared to AN and BN, investigations have found that BED is also associated with a range of

emotion regulation deficits. Gianini, White, and Masheb (2013) demonstrated this in a study of 326 treatment-seeking adults with obesity (BMI ≥ 30 kg/m$^2$) and DSM-IV (APA, 1994) defined BED who were administered the DERS (Gratz & Roemer, 2004), Emotional Overeating Questionnaire (Masheb & Grilo, 2006), EDE-Q (Fairburn & Beglin, 1994), and Beck Depression Inventory (BDI; Beck & Steer, 1987). The sample was predominately female (76.1%) with a mean age of 45.4 years (range: 19-65 years) and the following education breakdown: 45.7% graduated from college, 31.0% attended some college, and 23.1% had a high school education or less. Of the sample, 67.2% identified as white, whereas 21.2% identified as Black, 6.7% identified as Hispanic, 4.0% identified as "Other," and 0.9% identified as Asian.

The authors speculated that emotion dysregulation would account for unique variance in eating disorder psychopathology and emotional overeating when controlling for sex and negative affect, which was measured using the BDI (Beck & Steer, 1987). A series of hierarchical regressions supported this hypothesis: After accounting for the contributions of sex and negative affect, emotion regulation accounted for 2.2% of the variance in emotional overeating ($p < .01$) and 1.5% of the variance in overall eating disorder psychopathology ($p < .05$). A closer examination of DERS (Gratz & Roemer, 2004) subscales revealed that, when accounting for negative affect, the six subscales combined accounted for 21% of the variance in emotional overeating and 19% of the variance in overall eating pathology ($p$'s < .001). The Strategies and Clarity subscales uniquely predicted emotional overeating, while the Non-acceptance and Goals subscales uniquely predicted overall eating pathology.

The aforementioned results indicate that broad emotion regulation deficits are associated with both emotional eating and overall eating pathology in BED that may be driven by certain types of emotion regulation deficits. Two elements, 1) believing that there is little one can do to manage upset and 2) confusion regarding feelings, may be particularly salient variables when it comes to emotional overeating in BED. Targeting problematic beliefs about emotions and increasing emotional awareness may reduce emotional overeating in this population, and interventions focused on emotion acceptance and movement toward goals despite negative emotions may reduce overall eating pathology. Gianini et al.'s (2013) cross-sectional design precludes any firm conclusions regarding the temporal relationship between emotion regulation deficits, negative affect, and emotional overeating as well as overall eating pathology in BED. Future research should examine these variables using different methodologies with non-treatment samples to allow for generalization of findings. Nonetheless, Gianini et al. provide compelling evidence that BED is, indeed, associated with emotion dysregulation in a relatively ethnically diverse sample.

Thus far, it is established that AN, BN, and BED are associated with greater overall emotion regulation difficulties, as well as a range of specific deficits across DERS (Gratz & Roemer, 2004) subscales. However, it remains unclear whether there are diagnostic differences in emotion regulation deficits due to the lack of direct comparisons. The next series of studies reviewed in this section evaluate emotion regulation difficulties between eating disorder symptom clusters.

Harrison, Sullivan, Tchanturia, and Treasure (2010a) compared DERS (Gratz & Roemer, 2004) scores between women diagnosed with BN (n = 50), AN (n = 50), and

those without personal histories or first-degree relatives with psychological disorders including eating disorders (Controls; n = 90). Eating disorder diagnoses (or lack thereof for the control participants) were based on DSM-IV (APA, 1994) criteria established via record review or the Eating Disorder Examination (EDE; Fairburn, 2008). Participants were recruited from a variety of sources. Clinical groups were comprised of individuals from eating disorder research registries, treatment databases, and community advertisements, while control groups were recruited exclusively via community advertisements. On average, participants were in their late 20's (AN = 26.7 years, BN = 27.5 years, Control = 28.5 years), had an average of approximately 15 years of education, and identified as White British (84.7%; 15.3% identified as "other"). There were no significant group differences for age ($p$ = .26), years of education ($p$ = .20), or ethnicity ($p$ = .25). Those with eating disorders were symptomatic for many years (AN = 9.2 years of illness, BN = 8.4 years of illness).

Results revealed that both AN and BN were associated with broad emotion regulation deficits. Both eating disorder groups had significantly higher scores across all DERS subscales compared to the control group ($p$'s < .001), and there were no subscale differences between AN and BN ($p$'s > .05). These findings indicate the presence of emotion regulation deficits appears to differentiate women with eating disorders compared to women without, which parallels previous findings (see review by Lavender et al., 2015). Despite diagnostic differences, those with AN and BN experience similar deficits in emotion regulation.

Expanding on Harrison et al.'s (2010a) research, Svaldi, Griepenstrob, Taschen-Caffier, and Ehring (2012) examined whether emotion regulation deficits as measured by

the DERS (Gratz & Roemer, 2004) differed between those with eating disorders, psychiatric controls, and healthy controls. Participants included women with AN (n = 20), BN (n = 18), BED (n = 25), major depressive disorder (MDD; n = 16), and women without histories of clinically significant eating, mood, or personality pathology (HC; n = 42) who were recruited through advertisements at a European university. The sixth group was comprised of women diagnosed with borderline personality disorder (BPD; n = 15) who were psychiatric inpatients.

Study procedures were not described but it appears this was a cross-sectional, descriptive study that was not specifically affiliated with a treatment intervention, although it is important to note that BPD participants were receiving inpatient psychiatric treatment. Exclusion criteria included past or present psychosis or bipolar disorder, as well as current substance use disorder and/or suicidal ideation. Psychosis and bipolar disorder are relatively rare in eating disorder samples; however, excluding individuals with suicidal ideation is concerning given that it is commonly observed in eating disorders, BPD, and MDD (APA, 2013).

To examine the various facets of emotion regulation, Svaldi et al. (2012) analyzed DERS (Gratz & Roemer, 2004) subscales along with 17 subscales from the following measures: Affect Intensity Measure (AIM; Larsen, Diener, & Emmons, 1986), Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), and Inventory of Cognitive Affect Regulation Strategies (ICARS; Kamholz, Hays, Carver, Bird Gulliver, & Perlman, 2006). Emotion regulation subscale scores from all measures were grouped according to the following categories: intensity of emotions; acceptance of emotions; clarity, consciousness, and understanding of emotions; self-reported emotion regulation

problems; functional emotion regulation strategies; and dysfunctional emotion regulation strategies. Depression (BDI; Beck et al., 1961) and eating pathology (EDE-Q; Fairburn & Beglin, 1994) were also assessed.

With regard to demographics, significant group differences emerged for age ($p < .001$) and education level ($p < .001$). Participants in the BED and MDD groups were oldest (BED $M$ = 43.5 years, MDD $M$ = 46.4 years), followed by BPD ($M$ = 35.1 years), Healthy Control ($M$ = 27.8 years), BN ($M$ = 25.9 years), and AN ($M$ = 22.9 years) participants. Individuals in the relatively younger groups (AN, BN, HC) had higher levels of education compared to the older groups (BED, MDD, BPD). Analyses that examined the association between eating disorder severity and emotion regulation difficulties revealed that, similar to previous findings (Lavender et al., 2014), eating disorder severity was positively associated with DERS (Gratz & Roemer, 2004) subscales (Nonacceptance: $r = .46, p < .001$; Goals: $r = .46, p < .001$; Impulse: $r = .57, p < .001$; Awareness: $r = .33, p < .001$; Strategies: $r = .51, p < .001$; Clarity: $r = .44, p < .001$). These findings persisted after controlling for negative emotion intensity.

There were significant differences between the diagnostic groups (AN, BN, BED, MDD, BPD) and the control group across all emotion regulation categories with few discernable differences in those with various constellations of psychiatric symptoms. The psychiatric groups scored higher across all DERS subscales compared to healthy controls (*p's < .05)*. Comparisons between psychiatric groups indicated that BPD participants scored higher than BED participants on the Nonacceptance and Awareness subscales (*p*-value not reported). On the Clarity subscale, BN participants scored significantly higher than BED participants, and BPD participants scored significantly higher than BED and

MDD participants (*p*-values not reported). This indicates that those with BN and BPD may experience more confusion regarding their feelings as compared to BED. There were no differences between groups on the Goals subscale (*p*-values not reported). The BPD group scored significantly higher on the Impulse scale compared to other psychiatric groups with the exception of the BN group, which did not significantly differ from the BPD group on this dimension. Eating disorder participants reported significantly higher impulse control difficulties compared to MDD participants (*p*-values not reported). AN, BN, BPD, and MDD groups scored higher on the Strategies subscale than the BED group. Examination of emotion regulation strategies revealed that all psychiatric groups reported less engagement in cognitive re-appraisal and more engagement in emotional suppression compared to the control group. This is notable as various forms of psychopathology could benefit from interventions that teach cognitive restructuring and emotional acceptance.

With relatively few differences across psychiatric participants, results from this study demonstrate that emotion dysregulation is associated with a variety of psychiatric disorders, including MDD, eating disorders, and BPD, and may represent a marker of broad psychopathology as opposed to specific eating pathology (Svaldi et al., 2012). Results also support the possibility that, in relation to AN and BN, those with BED may have more access to emotion regulation strategies when upset.

The study possessed a number of strengths, including the use of psychiatric comparison groups and well-validated, interview-based diagnostic assessments. However, generalizability of findings to certain demographic groups (e.g., males) is limited and so future studies should examine emotion regulation in more

demographically diverse samples. Additionally, given sample size limitations in the eating disorder groups, results should be replicated as it could actually be that there are a number of differences in emotion regulation deficits between eating disorders but due to limited statistical power, such differences were undetectable.

Brockmeyer et al. (2014) attempted to overcome sample size limitations of Svaldi et al. (2012) and additionally investigated differences in emotion regulation between AN subtypes. They compared DERS (Gratz & Roemer, 2004) scores between 120 adult women with eating disorders (AN-R, n = 35; AN-BP, n = 22; BN, n = 34; BED, n = 29) and 89 healthy controls without lifetime histories of eating disorders or current psychiatric disorders such as depression. Healthy controls were divided according to BMI, with 29 participants classified as overweight controls (BMIs > 25 $kg/m^2$) and 60 participants classified as normal weight controls (BMIs between 18.5 and 25 $kg/m^2$). Eating disorder participants were recruited from both inpatient and outpatient eating disorder treatment centers as well as community advertisements; healthy controls were targeted via community advertisements.

Depressive symptoms were measured using the Patient Health Questionnaire (PHQ-9; Kroenke & Spitzer, 2002) and Beck Depression Inventory – II (BDI-II; Beck, Steer, & Brown, 1996). Because some participants completed the BDI-II and other participants completed the PHQ-9, BDI-II scores were transformed into PHQ-9 scores. Age and depression scores differed between groups ($p < .001$). Overweight controls ($M$ = 39.2 years) and those with BED ($M$ = 36.4 years) were significantly older than those with AN-R ($M$ = 26.1 years), AN-BP ($M$ = 25.7 years), BN ($M$ = 26.9 years), and normal weight controls ($M$ = 25.9 years). Depression scores were highest in AN-R and AN-BP

groups, followed by BN, then BED, and finally both healthy control groups. There were no significant differences in ethnic identity between groups ($p > .05$), with greater than 90% of participants identifying as Caucasian. Eating disorder groups did not differ with regard to the number of comorbid disorders as assessed by the Structured Clinical Interview for *DSM-IV* Disorders (SCID; First & Gibbon, 2004) ($p > .05$).

Based on previous findings, it was hypothesized that those with eating disorders would report greater emotion dysregulation than healthy controls and that eating disorder subtypes would not differ on specific facets of emotion regulation with the exception of impulsivity. Previous research had found that individuals with AN-R are less impulsive than those with bulimic tendencies, which characterize AN-BP, BN, and BED, and so it was predicted that AN-BP, BN, and BED would report poorer impulse control than AN-R. The authors also predicted that AN-BP and BN would report poorer impulse control than BED, citing neuropsychological evidence that BN and AN-BP, but not BED, are associated with impaired inhibitory control.

Findings indicated that those with eating disorders reported greater emotion dysregulation than control groups. AN-R, AN-BP, and BN participants scored significantly higher on DERS Total and subscale scores compared normal weight controls ($p$'s $< .001$). Participants with BED scored significantly higher on DERS Total and subscale scores than overweight controls ($p$'s $< .001$). This parallels a plethora of previous research indicating that those with eating disorders exhibit greater emotion dysregulation than healthy control samples. There were no differences in DERS Total and subscale scores between normal weight controls and overweight controls.

Facets of emotion dysregulation differed by eating disorder type, with AN-BP and BN participants reporting significantly greater overall emotion dysregulation compared to BED participants ($d$ = 0.79 and 0.74, respectively). There were no significant differences between eating disorder groups on DERS Acceptance and Awareness subscales. On the Clarity subscale, AN-R, AN-BP, and BN participants scored significantly higher than BED participants ($d$ = 0.66, 0.69, and 0.64, respectively). Participants with BN scored significantly higher than those with BED on the Goals subscale ($d$ = 0.76), while participants with AN-BP reported significantly greater difficulty accessing emotion regulation strategies than BED participants ($d$ = 1.31). Lastly, AN-BP participants exhibited greater impulse control difficulties compared to AN-R ($d$ = 0.64) and BED ($d$ = 0.71) participants, which partially supported the author's hypothesis that bulimic-type presentations would be associated with greater impulsivity than AN-R.

Findings must be considered in light of limitations. First, results may not generalize to individuals of different genders as the sample consisted of females only. Second, the eating disorder sample was comprised of individuals seeking treatment and those not seeking treatment. Although this does contribute to the study's generalizability, it is possible that those who were seeking treatment had greater eating pathology. Since greater eating pathology is associated with greater emotion dysregulation (Lavender et al., 2014; Svaldi et al., 2012), including a measure of eating disorder severity may have functioned to control for this source of error. Finally, without controlling for certain demographic variables that may impacted emotion regulation (e.g., depressive symptoms), one cannot rule out the possibility that depression severity, for instance, accounted for some findings. In light of the aforementioned limitations, eating disorder

group differences found by Brockmeyer et al. (2014) provide support for the assertion that BED may be associated with fewer emotion regulation deficits in certain domains (e.g., emotional clarity) relative to other eating disorders but that significant difficulties in emotion regulation in those with BED nonetheless exist in comparison to healthy controls, including those who are deemed overweight. Additionally, the authors concluded that AN subtypes do not need to be distinguished in future research of emotion regulation using the DERS since AN-R and AN-BP scored similarly across most DERS subscales (with the exception of impulse control difficulties).

Collectively, Harrison et al. (2010a), Svaldi et al. (2012), and Brockmeyer et al. (2014) illustrate that AN, BN, and BED share many similar deficits in emotion regulation but that BED may be associated with fewer emotion regulation deficits compared to other eating disorders, at least with regard to emotional clarity and access to emotion regulation strategies. Future research should replicate these findings using more demographically heterogeneous samples to include men and gender nonconforming individuals, and establish whether treatment-seeking eating disorder samples differ with regard to the severity of emotion dysregulation. Furthermore, findings may not extend to individuals with eating pathology who do not meet strict diagnostic criteria for AN, BN, or BED. Individuals with diagnoses of Other Specified Feeding or Eating Disorder and Unspecified Feeding or Eating Disorder (collectively referred to as Eating Disorder Not Otherwise Specified [EDNOS] in DSM-IV; APA, 1994), while rarely examined in eating disorder research relative to AN, BN, and BED, are common eating disorder diagnoses in community and treatment settings. It is therefore necessary to consider the extent to

which emotion regulation deficits among individuals with atypical eating disorders compare to AN, BN, and BED.

Ruscitti et al.'s (2016) findings helped to clarify this issue. Using a subset of data from a larger outcome study conducted at a private inpatient psychiatric hospital, deficits in emotion regulation were compared between those diagnosed with EDNOS (n = 120), AN (n = 29), BN (n = 22), and BED (n = 20), as well as 213 psychiatric controls. Although BED would have been classified as EDNOS in DSM-IV (APA, 1994), individuals with BED were separated from the EDNOS group for the purposes of the current study. Upon admission to the hospital, participants completed the DERS (Gratz & Roemer, 2004) to assess emotion dysregulation and were administered the SCID (First, Spitzer, Gibbon, & Williams, 2002) to establish eating, mood, anxiety, and substance use disorder diagnoses.

With a mean age of 31.3 years (SD = 12.7), the sample (N = 404) was predominately female (74.8%) and Caucasian (88.9%). Twenty-six percent had a college degree, 40.3% completed at least some college, and 9.8% had a high school diploma. Anxiety disorders, substance use disorders, and depressive disorders were common among those with eating disorders (69.1%, 63.4%, and 60.2%, respectively) and psychiatric controls (61.5%, 54.9%, and 63.8%, respectively). The extent to which demographic variables and psychiatric comorbidity varied between subgroups was unfortunately not reported but steps were taken to reduce the influence of potentially confounding variables. Specifically, a procedure called Propensity Score Matching was used to match individuals from the psychiatric control group with eating disorder

participants for various analyses on the basis of ethnicity, age, presence of a mood disorder, and the number of criteria met for BPD.

In the first set of analyses, differences in DERS Total and subscale scores were examined between those diagnosed with any eating disorder (n = 191) and matched psychiatric controls (n = 210). Findings revealed that those with eating disorders scored significantly higher than those without eating disorders on the Nonacceptance ($p < .01$), Goals ($p < .05$), Awareness ($p < .05$), and Strategies ($p < .01$) subscales, as well as the DERS Total score ($p < .01$). When specific eating disorder subgroups were examined in relation to psychiatric controls, results were mixed. There were no significant differences in DERS Total and subscale scores between individuals with BN versus psychiatric controls and individuals with AN versus psychiatric controls ($p$'s $> .05$). Individuals with BED scored significantly higher on the DERS Total score ($p < .01$), Strategies subscale ($p < .05$), and Clarity subscale ($p < .05$) compared to psychiatric controls. Individuals with EDNOS scored significantly higher on the Awareness subscale compared to psychiatric controls ($p < .05$).

Eating disorder groups were compared to one another in order to determine whether emotion regulation difficulties differed based on diagnostic status. Findings were largely non-significant, as participants with AN, BN, BED, and EDNOS exhibited similar emotion regulation deficits. However, individuals with BED reported less access to emotion regulation strategies compared to individuals with EDNOS (Strategies subscale; $p < .05$).

Results from this study demonstrate that atypical eating disorders are associated with emotion regulation deficits that are similar to those found in AN, BN, and BED.

Findings also support the possibility that eating disorders may be characterized by greater emotion dysregulation compared to other psychiatric populations. However, this largely contradicts Svaldi et al. (2012), who found more similarities than differences in emotion dysregulation between eating disorders and other psychiatric conditions. Furthermore, despite prior research suggesting that BED may actually be associated with fewer emotion regulation deficits (Svaldi et al., Brockmeyer et al., 2014), the BED group in Ruscitti et al.'s (2016) study scored higher (though not always significantly higher) across DERS subscales compared to EDNOS, AN, and BN groups. It is therefore possible that with a larger BED sample, as well as inclusion of individuals outside of inpatient psychiatric settings, Ruscitti's findings may differ.

**Negative affect and eating disorder behavior.** Although it is useful to know that individuals with eating disorders experience emotion regulation deficits, the significance of emotion regulation in the maintenance of eating pathology remains unclear based on studies reviewed thus far. While it could simply be that eating pathology and emotion regulation deficits co-occur in eating disorders but have no direct relationship, it is plausible that eating disorder symptoms, such as binge eating and purging, directly influence emotional states.

Affect regulation models of eating disorders (Hawkins & Clement, 1984; Wonderlich et al., 2014; see also Haedt-Matt & Keel, 2011) theorize that disordered eating functions to regulate negative emotions. Over time, engagement in eating disorder psychopathology becomes negatively reinforced as individuals learn that certain behaviors are effective, at least temporarily, in reducing negative emotions. To test this

hypothesis, one can examine antecedents and consequences of eating disorder behaviors to identify emotional states leading up to and following eating disorder episodes.

Over the last several decades, there have been a number of studies conducted in highly-structured environments to better control the sequenced assessment of affect and eating behavior that have produced findings consistent with the affect regulation model (e.g., Hetherington, Altemus, Nelson, Bernat, & Gold, 1994; Kaye, Gwirtsman, George, Weiss, & Jimerson; 1986). The use of laboratories can control for extraneous variables that might limit results, thereby increasing internal validity, and allows for the study of phenomena that would otherwise be untestable. However, laboratory studies also have several disadvantages; namely, the artificial setting and frequent use of intrusive measurement techniques (e.g., blood draws) limits the extent to which findings from these studies generalize to real-world settings, even in laboratories that are designed to more closely mimic one's natural environment.

Ecological momentary assessment (EMA; Stone & Shiffman, 1994) is an assessment method used to study eating disorder behaviors in one's natural environment that reduces several biases associated with laboratory studies and retrospective recall designs. Specific methods vary but all EMA studies share the following three characteristics: 1) data are collected over the course of a participant's daily life, 2) ratings are made based on a participant's current state (e.g., current affect), and 3) multiple ratings at different time points are obtained (Haedt-Matt & Keel, 2011). EMA studies in eating disorders thus far have obtained data through participant self-report.

EMA studies of emotion in eating disorders span the last three decades (see Haedt-Matt & Keel, 2011) and technological advances, such as handheld electronic

devices (e.g., smartphones), have enhanced EMA studies of eating disorder behavior (e.g., Smyth et al., 2007; Engel et al., 2013). Measurement accuracy is improved with the ability to time-stamp data points, instead of relying solely on participant report. Handheld electronic devices, which are now frequently used to study eating behavior as it occurs in one's natural environment, are quite portable, thus increasing the likelihood that data will be captured. Furthermore, programming options for these devices, which are continually evolving, allow researchers to study behavior in a variety of ways.

More than 90 EMA studies have been conducted that examine the temporal relationship between emotions and a range of eating disorder behaviors. A subset of these were the focus of Haedt-Matt and Keel's (2011) meta-analysis, which included 36 EMA studies of affect and binge eating from 1985 to 2007 (N = 968; 89% Caucasian women). Thirty-three studies included participants with BN or BED, two studies included self-identified binge eaters, and one study included participants with AN. Findings from Haedt-Matt and Keel's meta-analysis revealed that mean negative affect across studies was greater prior to binge eating episodes compared to average ratings of negative affect across studies (ES = 0.63, 95% CI [0.45, 0.82], $p < .001$) and compared to regular eating episodes (ES = 0.68, 95% CI [0.40, 0.95], $p < .001$). Mean negative affect across studies further increased after binge eating episodes (ES = 0.50, 95% CI [0.35, 0.64], $p < .001$), which was surprising as this fails to support the affect regulation model, which presumes that negative affect decreases following binge eating. This may be due to variability of effect sizes across studies. Heterogeneity analyses revealed that effect sizes did significantly vary across studies for all of the aforementioned analyses ($p$'s < .01). With regard to purging, average negative affect across studies decreased pre- to post-purging

episodes (ES = -0.46, 95% CI [-0.74, -0.18], $p < .01$). It is possible that certain eating disorder behaviors (e.g., purging) are more effective at regulating negative affect than others (e.g., binge eating). However, pre- to post-purging comparisons were only available for three studies included in the meta-analysis and so replication studies may bolster this finding (note: effect sizes did not significantly differ between these studies; $p = .60$).

The fact that negative affect did not decrease following binge eating may be explained by several factors. In addition to heterogeneity of effect sizes across studies, results may also reflect the points at which affect was examined (Berg et al., 2017). For instance, negative affect may decrease for a short period of time during or following binge eating but increase thereafter; this fluctuation may not have been captured by Haedt-Matt and Keel's (2011) analyses. Alternatively, examining affect over a longer period of time following binge eating may show a decrease in negative affect that was outside the scope of many studies reviewed in the meta-analysis. Smyth et al. (2007), one of the EMA studies included in Haedt-Matt and Keel's meta-analysis, is detailed below as it provides compelling evidence for this possibility.

In the largest EMA study of BN to date, 131 women diagnosed with BN using DSM-IV criteria (APA, 1994) carried handheld devices (i.e., palm pilots) for two weeks and responded to semi-randomly generated prompts six times per day (Smyth et al., 2007). In addition, participants entered data after they ate or engaged in eating disordered behavior (e.g., vomited), as well as at the end of each day. The following types of information were collected each time participants entered data into their handheld devices: 1) eating episodes, 2) eating disorder behaviors, 3) instances of self-mutilation

and other impulsive actions, 4) ratings of positive and negative affect that were based on a subset of items from the PANAS (Watson et al., 1988b) and the Profile of Mood States (Lorr & McNair, 1971), and 5) the occurrence and severity of stressful events that were selected from the Daily Stress Inventory (Brantley & Jones, 1989), which for analyses were transformed into an overall stress score.

Participants had a mean age of 25.3 years and the majority identified as Caucasian (96.9%), never married (85.0%), full-time students (69.0%). The three most common lifetime and current (past 30 days) psychiatric comorbidities were mood, anxiety, and substance use disorders. On average, binge eating episodes were reported on 40% of the days, self-induced vomiting episodes were reported on 46% of the days, and both binge eating and self-induced vomiting were reported on 33% of the days. Approximately 86% of the semi-random prompts were responded to in a timely manner (i.e., within 20 minutes). Not only does this indicate that compliance was high, it also allows for the analysis of events/affect states leading up to and following bulimic episodes.

The first analyses determined whether episodes of binge eating and vomiting were more likely to occur on days marked by higher negative affect, lower positive affect, and greater overall stress. Findings supported this hypothesis ($p$'s < .001). Next, analyses were conducted to more closely examine affect and stress prior to and following binge eating and purging episodes. In the hours leading up to binge eating episodes, negative affect and stress increased while positive affect decreased ($p$'s < .001). In the hours after binge eating episodes, positive affect increased while negative affect decreased ($p$'s < .001). Stress appeared to decrease in the hours following binge eating but did not reach statistical significance ($p > .05$). Similar trajectories were observed for vomiting episodes,

with negative affect and stress increasing and positive affect decreasing prior to vomiting episodes ($p$'s < .001), and negative affect decreasing and positive affect increasing post-vomiting episodes (both $p$'s < .001). Again, stress appeared to decrease following vomiting episodes but did not reach statistical significance ($p$ > .05).

Smyth et al.'s (2007) findings support the affect regulation model of BN and illustrate the importance of examining trajectories of negative affect as opposed to single data points (e.g., averaging negative affect ratings before versus after engaging in eating disorder behavior). In addition to a large sample size and use of a well-established diagnostic interview (SCID; First et al., 2002) to determine eating disorder diagnoses, participants underwent a two-day training period so they could become familiar with the handheld computer and to reduce the likelihood of reactivity. The authors used refined statistical analyses to examine the temporal relationship between affect and eating disorder behaviors, and there was high compliance for semi-random rating prompts. Despite these strengths, the generalizability of findings is limited given the lack of participant diversity in terms of age, education, ethnicity, marital status, and exclusion of males. Nonetheless, this study provides compelling evidence that bulimic behavior may function to regulate affect.

Although Smyth et al. (2007) demonstrated that individuals with BN experience fluctuations in negative affect between days, it was unclear from the initial analyses what overall patterns of negative affect look like in BN. In a follow-up analysis of the same dataset, Crosby et al. (2009) delineated daily negative affect patterns that were observed in their BN sample given this has not been previously studied. Nine distinct patterns of daily negative affect emerged from the 9,627 random assessments of affect over 1,725

days. The number of distinct pattern days participants experienced varied. Most participants (82%) experienced at least two different patterns of days, with 50% experiencing at least four different patterns of days. As participants did not, on average, engage in binge eating and purging on most days during the two-week assessment period, analyses were also conducted to determine whether any distinct patterns of negative affect were associated with increased likelihood of binge eating and/or purging. Binge eating was highest on days characterized by stable high negative affect ($p < .001$) and on days where negative affect was low in the morning and increased to a moderate level by the end of the day ($p < .001$). The same patterns were true for purging ($p$'s $< .001$). On these two types of days, binge eating and purging episodes most frequently occurred later in the day (i.e., early to late evening). Days with moderately stable negative affect also had significantly more binge eating ($p < .001$) and purging ($p < .01$) episodes compared to days with low negative affect. Two other types of days were associated with binge eating: days where negative affect was low for the first half of the day and then increased to a moderate level by evening ($p < .001$), and days where negative affect was moderately high in the morning and evening ($p < .001$).

These findings indicate that individuals with BN experience a range of days consisting of various trajectories of negative affect and that bulimic behavior, which tends to occur later in the day, is more likely on afternoons and evenings marked by moderate to high negative affect compared to days with consistently low negative affect or decreasing negative affect throughout the day. There are several important points to note about Crosby et al.'s (2009) analyses. First, these results do not imply that a causal relationship exists between negative affect and bulimic behavior such that negative affect

causes bulimic behavior. While this is possible, it could also be that other factors, such as dietary restriction, lead to both negative affect and bulimic behavior. Bulimic behavior might also lead to negative affect, which may then prompt further bulimic behavior. Nonetheless, the aforementioned analyses suggests that treatments for BN might use the results of this study to help individuals better plan for high-risk times, such as in the evening.

Several studies have examined the relationship between negative affect and binge eating, as well as purging, in BN and BED samples. However, less is known about this relationship in AN. Using nearly identical methodology to Smyth et al. (2007), Engel et al. (2013) examined affect and a range of eating disorder behaviors in a sample of 118 adult females with DSM-IV diagnoses of AN or subthreshold AN (i.e., all AN criteria were met except for amenorrhea, an absence of AN cognitive features, or a BMI between 17.5 and 18.5 $kg/m^2$). An examination of the trajectory of negative affect preceding and following a range of eating disorder behaviors revealed that, similar to Smyth et al., negative affect increased prior to loss of control eating ($p < .001$), purging ($p < .001$), and eating and purging episodes ($p < .001$). Negative affect subsequently decreased in the hours following loss of control eating ($p < .01$), purging ($p < .05$), and loss of control eating and purging ($p < .01$) episodes. Interestingly, negative affect was lower at the time of purging episodes compared to loss of control eating accompanied by purging episodes and decreased less rapidly following purge-only episodes versus loss of control eating and purging episodes ($p$'s $< .05$). Negative affect increased in the hours leading up to engagement in self-weighing ($p < .01$) but neither increased nor decreased following this

behavior ($p > .05$). There was no association found between negative affect and exercise, as well as negative affect and drinking fluids to curb appetite ($p$'s $> .05$).

Engel et al.'s (2013) findings provide additional support for the affect regulation model and, similar to others (e.g., Haedt-Matt & Keel, 2011), indicate that certain behaviors may be more effective in regulating negative affect than others. However, as with other EMA studies in eating disorders, data may not adequately capture changes in affect in the minutes or seconds before, during, and after engagement in eating disorder symptoms because EMA studies often rely on data captured in the hours preceding and following behaviors of interest.

The use of the term negative affect is likely to be of little benefit to those presenting for eating disorder treatment as it is rather broad and not colloquial. As negative affect appears to be a critical precursor to several eating disorder behaviors, a logical next step is to determine which, if any, aspects of negative affect account for this relationship. Using Smyth et al.'s (2007) dataset, Berg et al. (2013) examined facets of negative affect (i.e., fear, guilt, hostility, and sadness) before and after binge-only, purge-only, and binge and purge events. Fear, guilt, and sadness all increased in the hours leading up to binge-only ($p$'s $< .001$), purge-only ($p$'s $< .05$), and binge and purge ($p$'s $< .001$) events. Hostility increased prior to binge-only ($p < .001$), and binge and purge ($p < .001$) events but not purge-only events ($p > .05$). All four facets significantly decreased in the hours after binge-only, purge-only, and binge and purge events ($p$'s $< .001$); however, when controlling for other facets, only guilt remained significantly related to all three bulimic events ($p < .001$).

Guilt may therefore be a particularly prominent negative emotion that is reduced through the use of bulimic behaviors. Support for this assertion comes from Berg et al. (2015), who also found that guilt significantly increased prior to and decreased following binge eating episodes in a non-clinical sample of adults with obesity ($p$'s < .01). Although guilt has been identified as an affective state that may increase one's risk for using eating disorder behavior, a closer examination of variables comprising the guilt subscale of the PANAS (Watson et al., 1988b; i.e., "ashamed," "angry at self," dissatisfied with self," "disgust") reveals that this subscale may actually be more accurately described as shame (Berg, personal communication). Whereas guilt is a reaction to a specific behavior, shame is a more global, devastatingly negative reaction to the self as a whole (Tangney, Wagner, & Gramzow, 1992). Therefore, compared to other types of negative emotions, shame may be more likely to precipitate eating disorder psychopathology.

**Summary of emotion regulation deficits in eating disorders.** Individuals with eating disorders experience a range of emotion regulation deficits, including impairments experiencing, identifying, and accepting emotions; difficulty controlling impulses and engaging in goal-directed behavior when upset; and engaging in adaptive strategies when experiencing negative emotions in comparison to healthy controls (Gianini et al., 2013; Lavender et al., 2015). Although individuals with AN, BN, BED, and EDNOS experience a number of similar difficulties with regard to emotion regulation deficits (Brockmeyer et al., 2014; Harrison et al., 2010a; Ruscitti et al., 2016; Svaldi et al., 2012), there is some evidence that compared to other types of eating disorders, those with BED may experience fewer emotion regulation deficits in certain areas, such as emotional clarity

(Brockmeyer et al., 2014; Svaldi et al., 2012). However, replication studies are needed to clarify the types of emotion regulation difficulties that differ between diagnoses while controlling for potentially confounding variables, such as negative affect.

Additionally, greater eating disorder psychopathology is associated with greater emotion regulation deficits (Lavender et al., 2014; Svaldi et al., 2012), and there is compelling evidence that certain eating disorder behaviors may function to regulate emotions (Berg et al., 2013; Berg et al., 2015; Engel et al., 2013; Haedt-Matt & Keel, 2011; Smyth et al., 2007). This explains why seemingly maladaptive behaviors, such as binge eating and purging, persist in light of significant consequences and functional impairment. Targeting emotion regulation deficits in eating disorders, along with heightened negative affect (and shame specifically), may reduce one's reliance on eating disorder behaviors to manage affective states.

**Emotion Regulation and Eating Disorder Treatment**

Psychological treatments for eating disorders have historically centered on cognitive behavioral interventions, which target thoughts and behaviors hypothesized to maintain eating pathology. Cognitive Behavior Therapy (CBT; Fairburn, Marcus, & Wilson, 1993) and its revised version, Cognitive Behavior Therapy – Enhanced (CBT-E; Fairburn, 2008), are among the most well supported eating disorder interventions (Wilson et al., 2007). Although CBT-E is associated with improvements in eating psychopathology across eating disorder diagnoses (e.g., Fairburn et al., 2009; Fairburn et al., 2013), subsets of individuals treated with CBT interventions do not experience symptom improvement (Wilson et al., 2007).

Given the salience of emotion dysregulation in eating disorders, several newer psychotherapy treatments have been developed to more specifically target emotion regulation deficits observed in eating disorders. Dialectical Behavior Therapy (DBT; Linehan, 1993) is based on the premise that maladaptive behaviors, such as suicidal thoughts and self-harm, function to regulate negative affect. Traditionally comprised of individual therapy and a weekly skills group, DBT interventions target mindfulness, distress tolerance, emotion regulation, and interpersonal effectiveness. This treatment has been adapted for use with binge eating and BN (Safer, Telch, & Chen, 2009), and a recent meta-analysis found that DBT produced reductions in eating disorder psychopathology and improvements in comorbid depressive symptoms (Lenz, Taylor, Fleming, & Serman, 2014).

Although there is some evidence that DBT is an option for those with eating disorders, more randomized controlled trials that compare DBT to active treatment conditions are needed. Not only would this clarify whether DBT is a viable alternative to other evidence-based treatments for eating disorders (e.g., CBT-E), examining changes in emotion regulation in DBT versus comparison treatments can shed light on whether DBT is especially well-suited to treat emotion regulation deficits observed in eating disorders. Thus far, there have only been a few studies that have specifically examined changes in emotion regulation following DBT for eating disorders.

In the first, Safer, Hagler Robinson, and Jo (2010) sought to determine whether DBT led to improvements in eating disorder psychopathology and emotion regulation above and beyond a comparison treatment in adults with BED, which was diagnosed using the SCID-I (First et al., 2002). This randomized controlled trial compared 20, two-

hour sessions of DBT for BED versus 20, two-hour sessions of an active comparison group therapy (ACGT). The AGCT used a Rogerian approach (Rogers, 1951) that highlighted participant strengths, encouraged elimination of binge eating, and explored self-esteem, feelings, and binge eating but did not teach behavioral skills, explicitly link emotions and binge eating, systematically review homework, and elicit a verbal commitment to eliminating binge eating (Safer & Hugo, 2006). In addition to the Eating Disorder Examination (EDE; Fairburn & Cooper, 1993), the Rosenberg Self-Esteem Scale (RSEQ; Rosenberg, 1979), and BDI (Beck et al., 1961) were administered at baseline and at end of treatment, as well as at three-, six-, and 12-months following the end of treatment. Participants also completed the DERS (Gratz & Roemer, 2004) and Negative Mood Regulation Scale (NMR; Catanzaro & Mearns, 1990), which measured the expectancy that behaviors and cognitions will relieve negative affect (p. 546), as well as the PANAS (Watson et al., 1988b) and the Emotional Eating Scale (EES; Arnow, Kenardy, & Agras, 1995), which is comprised of three subscale scores (Anger/Frustration, Anxiety, & Depression) that are determined based on the extent to which various emotions result in urges to eat.

Participants (N = 101) were predominately female (85%), Caucasian (76%; 13% Latino, 5% Asian, 3% African American, 3% Unknown), and married (60%). Over 90% of the sample completed at least some college. Approximately 15% of the sample met criteria for a current depressive episode and 63% of the sample reported a history of depression. Of the aforementioned demographic characteristics, the only significant difference that was found was that more DBT participants had a concurrent depression compared to ACGT participants ($p < .05$).

At the end of treatment, DBT produced greater abstinence rates than ACGT (64% versus 36%, respectively; $p < .05$) but 12 months later, there were no significant differences between DBT and ACGT (64% versus 56%, respectively; $p > .05$). At end of treatment, DBT was associated with greater improvements than ACGT on the BDI ($d = .54$), EES Anger/Frustration subscale ($d = .23$), EES Anxiety subscale ($d = .34$), and EES Depression subscale ($d = .41$); none of these differences persisted 12 months later. In fact, the 12-month follow-up data indicated that ACGT was associated with greater reductions in overall emotion dysregulation as measured by the DERS ($d = -.21$) and decreased negative affect as measured by the PANAS ($d = -.36$) in comparison to DBT.

Study findings highlight the importance of longer follow-up intervals and suggest that while DBT was effective in eliminating binge eating in over half of the sample, and that abstinence from binge eating persisted over time, other treatments may be equally effective, at least in the long run. With that said, as the DBT group had higher rates of depression, it is possible that DBT may be particularly well-suited for individuals with co-occurring mood disorders. It is difficult to draw sound conclusions from this study as replication of results is warranted, but what is encouraging is that emotion regulation deficits and negative affect improve when individuals with BED seek treatment, even when there is no explicit focus on emotion regulation. In addition to replication studies, DBT should be compared with AGCT and other comparison treatments in samples of BN and AN to determine its impact on eating disorder psychopathology as well as emotion regulation. Finally, as with other evidence-based eating disorder treatments (Wilson et al., 2007), because a significant minority of individuals who received DBT remained

symptomatic at end of treatment and follow-up, future research should identify variables that impact treatment outcome.

Using data from a study that examined the efficacy of a guided self-help version of DBT for BED that consisted of a self-help manual along with six, 20-minute supportive phone calls (Masson, von Ranson, Wallace, & Safer, 2013), Wallace, Masson, Safer, & von Ranson (2014) conducted secondary analyses to determine whether changes in emotion regulation from beginning to end of treatment predicted binge eating abstinence at end of treatment and at follow-up. Of the 60 participants, most were female (88%) and Caucasian (90%), with an average age of 42.8 years (*SD* = 10.5). All participants graduated high school (or its equivalent), and 25% were taking stable doses of psychotropic medication. The EDE (Fairburn & Cooper, 1993) was administered at end of treatment and at six-month follow-up to determine number of binge eating episodes in the preceding three months. Change scores were obtained by comparing pre-treatment versus post-treatment DERS Total scores (Gratz & Roemer, 2004). Using binary logistic regression analyses, results indicated that changes in emotion regulation over treatment predicted binge eating abstinence at end of treatment ($p < .01$) as well as four months ($p < .01$), five months ($p < .05$), and six months ($p < .05$) later. Additionally, individuals who were abstinent from binge eating at the end of treatment and at follow-up points had approximately three times as much change in DERS scores than individuals who were not abstinent from binge eating at these time points ($p$'s $< .01$).

Because a subset of individuals did not complete all portions of end of treatment and follow-up assessments, the aforementioned findings were based on a dataset in which any missing data was replaced with the last observation carried forward method. To

determine whether this approach impacted findings, the authors re-ran analyses using only data from participants who completed both the EDE and DERS at end of treatment (n = 39) and at six-month follow-up (n = 33). Results were largely comparable but, likely due to limited statistical power, several findings were no longer statistically significant. What did remain significant were findings that changes in emotion regulation during treatment predicted binge eating abstinence four months after the end of treatment ($p < .05$), and that individuals who were abstinent at four months experienced significantly greater improvements in emotion regulation over treatment compared to individuals who were not abstinent at this time point ($p < .01$).

Study results highlight the importance of improving emotion regulation in those with BED as this may have direct implications for binge eating abstinence, at least in the months following treatment. Furthermore, findings indicate that frequent contact with a therapist, at least within the context of DBT, may not be necessary for improvements in emotion regulation. With that said, a number of study participants did not experience abstinence from binge eating at the end of treatment (60%) and even more were not abstinent from binge eating at six-month follow-up (70%). Perhaps these participants may have benefitted from more frequent interaction with a therapist and/or treatment group, a different treatment entirely, or adjunct interventions that were emotion-focused.

In addition to DBT, another compelling emotion-focused treatment for eating disorders, and BN specifically (Wonderlich et al., 2014), is Integrative Cognitive Affective Therapy (ICAT; Wonderlich et al., 2015). In ICAT, momentary affective states preceding bulimic episodes are thought to be influenced by self-discrepancy and self-directed behavior. Self-discrepancy captures differences between the attributes

individuals believe they actually possess, ideally would like to possess, and believe they should possess (Higgins, 1987), whereas self-directed behavior reflects positive and negative ways individuals treat themselves (Wonderlich et al., 2015).

Integrative Cognitive Affective Therapy retains certain components of CBT thought to be particularly efficacious (i.e., self-monitoring, planned meals and snacks to reduce dietary restriction and restraint, relapse prevention), and incorporates principles from motivational interviewing (Miller & Rollnick, 2013) because individuals often present for eating disorders treatment with ambivalence (Killick & Allen, 1997; Vitousek, Watson, & Wilson, 1998). This treatment also includes a range of interventions that directly target deficits in emotion regulation. Early in treatment, ICAT provides education about the function of emotions and encourages individuals to experience and identify their emotions on a regular basis instead of engaging in emotional suppression. When faced with negative emotions, ICAT assists individuals in determining strategies to more adaptively cope with negative emotions. Furthermore, individuals are taught to more adaptively manage a range of situations that elicit negative emotions preceding engagement in eating disorder behavior (e.g., assertiveness training is introduced for those whose passivity in social exchanges leads to resentment, which may then lead to binge eating).

Wonderlich et al.'s (2014) randomized controlled trial comparing ICAT to a CBT-E in 80 adults with broadly-defined BN indicated that both CBT-E and ICAT produced significant reductions in bulimic behavior and eating pathology, as well as improvements in emotion regulation. In a follow-up study using data from Wonderlich et al., Peterson et al. (2017) used a series of regression analyses to determine the extent to

which changes in emotion regulation, as well as positive and negative self-directed behavior and self-discrepancy, predicted reductions in binge eating and purging in ICAT versus CBT-E at mid-treatment, end-of-treatment, and four-month follow-up. Frequency of binge eating and purging were computed using the EDE (Fairburn & Cooper, 1993), while emotion regulation, self-directed behavior, and self-discrepancy were determined via change scores from the DERS (Gratz & Roemer, 2004), Structural Analysis of Social Behavior Intrex questionnaire (Benjamin, 2000), and Selves Interview (Higgins et al., 1996).

The hypotheses that there would be stronger indirect effects of ICAT versus CBT-E on binge eating, purging, and global eating disorder psychopathology at end of treatment and at four-month follow-up via changes in emotion regulation, self-directed behavior, and self-discrepancy were not supported. In other words, the type of treatment one received did not impact the extent to which emotion regulation, self-directed behavior, and self-discrepancy predicted improvements in eating disorder symptoms (all $p$'s > .05). The authors (Peterson et al., 2017) speculated this may be due to several factors, including similarities between treatments (e.g., planned meals and snacks) and limited statistical power. They also questioned whether CBT-E's focus on problem solving, elimination of body checking behavior, and reduction of the importance of shape and weight may have impacted variables such as self-discrepancy and emotion regulation via mood enhancement, behavioral disconfirmation, and exposure (Peterson et al., 2017, p. 643).

Results also indicated that improvements in emotion regulation and self-directed behavior from the beginning to middle of treatment predicted reductions in overall eating

pathology at end of treatment ($p$'s < .01) but not reductions in binge eating or purging frequency ($p$'s > .05). Emotion regulation and self-directed behavior changes between beginning of treatment to end of treatment predicted reductions in overall eating pathology at four-month follow-up ($p$'s < .01). Furthermore, improved emotion regulation from pre- to post-treatment predicted reductions in binge eating at follow-up, and improvements in positive self-directed behavior from pre- to post-treatment predicted reductions in purging at follow-up ($p$'s < .01). There were no significant findings related to changes in self-discrepancy from beginning to end of treatment, no significant findings related to binge eating, purging, or global eating pathology at four-month follow-up ($p$'s > .05; note: the Selves Interview was not administered at mid-treatment so only the impact of pre- to post-treatment changes on eating pathology at the follow-up point could be analyzed).

The finding that emotion regulation significantly improved among individuals with BN regardless of treatment condition indicates that a range of interventions for BN may be responsible for improved emotion regulation and that in the months following completion of ICAT and CBT-E, improvements in emotion regulation are likely to persist. Dismantling studies could be useful to determine what types of interventions are associated with the greatest improvements in emotion regulation. Additionally, the reductions in emotion regulation deficits throughout treatment that were associated with improvements in broad eating psychopathology and binge eating at four-month follow-up is consistent with Wallace et al. (2014), and suggests that improved emotion regulation may decrease one's reliance on eating psychopathology to regulate emotions. Future studies should examine the impact of ICAT and CBT-E on changes in specific facets of

emotion regulation. For example, it could be that while both treatments are associated with improvements in impulse control difficulties and the pursuit of goal-directed behaviors when upset, ICAT may be uniquely suited to address difficulties in emotion awareness, clarity, and acceptance. Replication of both Wonderlich et al. (2014) and Peterson et al.'s (2017) findings is also indicated, especially with larger samples that include individuals with AN and BED. Including DBT and/or an active comparison treatment may also be worthwhile to determine what treatments work best and for whom.

As the aforementioned studies examining emotion regulation and treatment have exclusively used samples of BN and BED, it remains unclear whether interventions such as ICAT and DBT are well-suited for AN. There are certainly similarities across eating disorders but the impact of starvation and low body weight creates additional challenges for the treatment of AN. In 2011, Wildes and Marcus introduced a novel treatment specifically for AN, Emotion Acceptance Behavior Therapy (EABT), based on their premise that AN symptoms function to maintain emotion avoidance. This treatment incorporates a range of emotion regulation and behavioral interventions to facilitate weight regain and eating disorder symptom reduction including: mindfulness and acceptance of emotions, thoughts, and physical sensations; self-monitoring; linking emotions with behavior; graded exposure to feared situations (e.g., social settings); and relapse prevention.

A pilot study (Wildes, Marcus, Cheng, McCabe, & Gaskill, 2014) was published that tested the preliminary effectiveness of EABT in a sample comprised of 24 individuals with BMIs between 16.0 and 18.5 kg/m2 who met DSM-IV (APA, 1994) criteria for AN. There was no comparison group. The average age of participants was

26.8 years (*SD* = 11.6 years), and slightly less than half of participants met criteria for AN-BP (45.8%). Ninety-six percent of participants identified as female and all were Caucasian.

Results were notable for the high dropout rate (13 of the 24 participants completed treatment), which the authors noted was comparable to other treatment studies of AN (Wildes et al., 2014). There were no significant differences (note: *p*-values not reported) observed between completers and non-completers on demographic variables, EDE (Fairburn, Cooper, & O'Connor, 2008) scores, and self-report measures that assessed anxiety (Beck Anxiety Inventory; Beck, Epstein, Brown, & Steer, 1988), depression (BDI-II; Beck et al., 1996), quality of life (Eating Disorders Quality of Life; Engel et al., 2006), and experiential avoidance (Acceptance & Action Questionnaire; Hayes et al., 2004). Those who completed treatment experienced significant improvements in overall eating pathology, anxiety, depression, quality of life, and emotional acceptance pre- to post-treatment, as well as at three- and six-month follow-up points (*p*'s < .05). Body mass index significantly increased from pre- to post-treatment ($p < .01$), pre-treatment to three-month follow-up ($p < .05$), and pre-treatment to six-month follow-up ($p < .01$).

Emotion Acceptance Behavior Therapy may therefore be an effective treatment that can facilitate emotion acceptance and improved eating disorder psychopathology for a subset of individuals with AN who are able and willing to commit to the entirety of treatment. This treatment should be examined in larger, demographically heterogeneous randomized controlled trials to establish its efficacy and clarify its impact on emotion

regulation. Additional interventions to target dropouts (e.g., motivational interviewing) may enhance this treatment for AN.

Additional evidence of changes in emotion regulation following treatment for AN comes from Rowsell, MacDonald, and Carter (2016), who analyzed DERS (Gratz & Roemer, 2004) and EDE-Q (Fairburn & Beglin, 1994) scores obtained at the beginning and end of treatment for 108 patients with AN who participated in an inpatient/partial hospitalization eating disorder program. The sample was predominately female (96.3%), Caucasian (88.1%; 3.0% Asian, 10.9% "Other"), and single (72.6%), with an average age of 29.9 years (*SD* = 10.9) and average pre-treatment BMI of 14.9 kg/m$^2$ (*SD* = 1.4 kg/m$^2$). The majority of participants were classified as AN-BP (58.5%). Participants remained in treatment, which consisted primarily of cognitive behavioral interventions as well as DBT skills training and interpersonal therapy delivered in group formats, for an average of 14.4 weeks (*SD* = 7.1). Seventy-two participants completed the program and achieved a BMI of at least 19.5 kg/m$^2$. There were few significant differences between completers and non-completers except that non-completers reported more laxative use than completers ($p < .05$). Analyses were based on data from those who completed treatment and questionnaires (n = 53).

Emotion regulation improved from the beginning to end of treatment, as evidenced by significant reductions in DERS Total and subscale scores from pre- to post-treatment ($p$'s < .05). Interestingly, these findings were no longer significant when weight gain was included as a covariate, indicating that weight restoration may be a significant driver of emotion regulation improvements in treatment.

Additional findings indicated that even when controlling for weight gain, improvements in DERS subscales were associated with improvements in EDE-Q global scores ($p$'s < .05). To determine which DERS subscales best predicted changes in EDE-Q global scores, stepwise multiple regression analyses were conducted. The best fitting model included Goals and Clarity subscales as predictors, which accounted for 36% of the improvement in eating disorder psychopathology ($p < .001$, $R^2 = .36$). Teaching individuals with AN to differentiate emotional states and pursue goals in light of negative emotions may therefore be specific emotion regulation strategies to emphasize in treatment. Lastly, Rowsell et al. (2016) identified differences in emotion regulation between AN subtypes at baseline and end of treatment. The AN-BP subgroup scored significantly higher on the DERS Total scale ($p < .01$), Impulse subscale ($p < .001$), and Strategies subscale ($p < .01$) at baseline, and reported greater improvements in impulse control from pre- to post-treatment ($p < .001$) compared to the AN-R subgroup. Additional attention to these specific emotion regulation difficulties in the treatment of AN-BP may enhance recovery rates.

In spite of small samples sizes, lack of a control condition, and exclusion of non-completers from primary analyses, Rowsell et al.'s (2016) study has several implications. First, emotion regulation can, and does, improve in clinical settings that do not strictly here to specific manualized treatments. This is especially noteworthy in AN, where evidence-based treatments are limited. Second, this study provided evidence that weight regain is associated with improvements in emotion regulation. Not only does this highlight the importance of targeting weight gain in AN treatment, it also leaves the possibility that improvements in emotion regulation drive weight regain or that a third

variable accounts for improvements in both. Future studies should compare the temporal relationship between emotion regulation and weight regain in AN treatment while considering additional variables that might serve as mediators. Lastly, differences in impulse control between AN subgroups parallel previous research (e.g., Brockmeyer et al., 2014) demonstrating subtype differences. Although Brockmeyer et al. concluded that AN subtype need not be distinguished in studies of emotion regulation given more similarities than differences in emotion regulation deficits, it may actually be beneficial to separate these subtypes, especially given their potentially differential trajectories of improvement with regard to impulsivity over the course of treatment.

The final study included in this section focuses less so on treatment and more so on the relationship between emotion regulation and AN symptoms in the year following treatment. Racine and Wildes' (2015) sample included 191 participants ($M$ = 26.5 years, $SD$ = 10.2 years) with DSM-IV (APA, 1994) AN (note: participants who did not meet the amenorrhea criteria or who denied fear of fatness were also included) who partook in a longitudinal investigation of the naturalistic course of AN following inpatient/day treatment in a clinical setting. Data were obtained at treatment discharge and at three, six, and 12 months post-discharge. The EDE (Fairburn et al., 2008), DERS (Gratz & Roemer, 2004), and BDI-II (Beck et al., 1996) were administered at each time point.

The majority of participants identified as female (95.3%), non-Hispanic Caucasian (95.3%), and were either employed (25.1%) or students (44.0%). Approximately 80% (n = 152) had a lifetime mood disorder, 63.4% had a lifetime anxiety disorder, and 36.1% had a lifetime substance use disorder. At treatment admission, 42.9% of the sample was classified as AN-R, the rest (57.1%) were diagnosed with AN-BP.

There were no significant differences in emotion regulation or AN symptom severity at discharge between those who completed all follow-up assessments versus those missing at least one assessment ($p > .05$).

Changes in AN symptomatology were best predicted by emotion regulation at the previous time point; the reverse was not true (i.e., changes in AN symptomatology did not predict emotion regulation). This relationship persisted after considering the influence of depression and BMI, two potential mediating variables. The fact that emotion regulation predicted AN symptomatology following treatment is even more fascinating in consideration of their change equation, which proposes that individuals with average AN symptoms and high emotion dysregulation at discharge have an initial increase (0.95 EDE units) and subsequent maintenance of AN symptoms one year after discharge, whereas individuals with average AN symptoms and low emotion dysregulation demonstrate a decrease of 1.04 EDE units in the year following discharge (p. 791).

These findings support treatments, such as EABT, that target emotion regulation difficulties in AN and are strengthened by the study's large sample size and one-year follow-up period, as well as use of refined statistical analyses (i.e., dynamic bivariate LCS model) that elucidate the temporal relationship between emotion regulation and AN symptomatology. Replication studies can bolster support for study findings and may be especially useful in follow-up studies of EABT, as well as in samples of BN and BED.

***Summary.*** While targeting emotion regulation in eating disorder treatment seems promising, research on emotion regulation and eating disorder treatment is in its infancy, with several important questions remaining. Without dismantling studies, the extent to which emotion regulation changes can be attributed to specific interventions unique to

emotion-focused therapies is unclear, as is whether improvements in emotion regulation persist over longer periods of time (i.e., years versus months). Additionally, psychotherapy in research settings differs from psychotherapy in clinical care settings. One reason for this is that treatment trials oftentimes test the efficacy, not effectiveness, of specific interventions. Psychotherapy delivered in research settings is often highly structured (i.e., manual-based), with therapist adherence to the treatment manual being critically important. In contrast, therapists treating eating disorders in clinical settings are likely to use evidence-based approaches that are more tailored to the specific needs of the individual as opposed to strictly adhering to therapy manuals. The generalizability of treatment trial findings based on participant demographics is also problematic, as research participants are typically not representative of the larger eating disorder population given strict inclusion/exclusion criteria and lack of demographic diversity (e.g., the vast majority of participants identify as Caucasian women). Effectiveness studies are needed that measure changes in emotion regulation throughout treatment and well after treatment ends using diverse samples, as are studies that examine facets of emotion regulation among individuals in eating disorder recovery. Establishing whether emotion regulation deficits persist in the context of eating disorder recovery will inform treatment development and may have implications for maintenance models of eating disorders.

**Emotion Regulation and Eating Disorder Recovery**

Limited research exists on emotion regulation in eating disorder recovery despite qualitative research implying that emotion regulation is important to the recovery process (Federici & Kaplan, 2008). Of this limited pool of studies, most used recovered and/or

weight-restored AN samples to determine whether emotion regulation difficulties best characterize the acute illness phase or are an enduring trait.

Harrison, Tchanturia, and Treasure (2010b) administered several questionnaires, including the DERS (Gratz & Roemer, 2004); EDE-Q (Fairburn et al., 1998); Depression, Anxiety, and Stress Scale – 21 (Lovibond & Lovibond, 1995); and Obsessive Compulsive Inventory (Foa et al., 2002) to those with current AN versus past AN to test whether there are emotion regulation deficits in AN recovery. Social affective attentional biases and emotion recognition difficulties have been observed among individuals with active eating disorders and so in addition to completing questionnaires, participants were administered two computer-based tasks; one assessed attentional biases toward angry and neutral faces versus inanimate objects (Pictorial Stroop Task; Ashwin, Wheelwright, & Baron-Cohen, 2006) and the other assessed emotion recognition in others (Reading the Mind in the Eyes Task; Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). Of the 175 female participants who were recruited via eating disorder clinics and community postings, 50 had acute AN, 35 were deemed recovered from AN, and 90 were healthy controls without personal or family histories of psychological disorders as determined by the SCID (First et al., 1996). Individuals with acute AN were diagnosed by chart review, EDE (Fairburn & Cooper, 1993), and/or EDE-Q; methods used to diagnose AN varied between participants based on their recruitment source (e.g., only those in outpatient treatment or those not receiving treatment were administered the EDE). Inclusion in the recovered AN group was determined by the following: 1) historical AN diagnosis using the SCID, 2) regular menses over the past year, 3) EDE-Q total scores below a clinically significant cutoff point (below 4), and 4) BMIs of at least 18.5 $kg/m^2$ over the past year.

There were no significant between group differences in age (Acute AN: $M = 26.7$, Recovered AN: $M = 29.0$, Healthy Control: $M = 28.5$; $p > .05$) or ethnicity ($p > .05$). The majority of participants were White British (82.9%; 17.1% identified as "Other"). As expected, those in the recovered and healthy control groups had significantly higher BMIs relative to the acute AN group ($p$'s $\leq .001$); there were no BMI differences between the recovered AN and healthy control groups ($p > .05$). The acute AN group had a longer mean duration of illness compared to the recovered AN group (9.2 versus 5.5 years, $p < .05$). The acute AN group also had higher unemployment rates and greater use of psychiatric medication for depression compared to the recovered AN and healthy control groups ($p$'s $< .05$).

The DERS Total and subscale scores differed between groups, with the acute AN group scoring significantly higher on all DERS Total and subscales versus the recovered AN and healthy control groups ($p$'s $\leq .001$); there were no significant differences between the recovered AN and healthy control groups on these scales ($p$'s $> .05$). Both the acute AN and recovered AN groups demonstrated significantly greater attentional biases toward angry and neutral faces ($p$'s $\leq .0001$), and poorer emotion recognition ($p < .001$), compared to the healthy control group. The acute AN group had significantly higher DASS-21 Total and subscale scores, which captured stress, anxiety, and depression, compared to the recovered AN and healthy control groups ($p$'s $\leq .001$); the same pattern was found regarding OCI Total scores (both $p$'s $< .01$). There were several differences between the recovered AN and healthy control groups. The recovered AN group scored higher on the DASS-21 Total and subscale scores compared to the healthy control group ($p's < .01$) with the exception of the Anxiety subscale ($p > .05$). There were

no significant differences between these groups on the OCI Total scale ($p > .05$). Although both the recovered AN and healthy control groups both scored within the nonclinical range on the EDE-Q Global scale, the healthy control group scored significantly lower ($p < .01$).

These findings, which are supported by use of several psychometrically supported instruments, multiple criteria used to determine recovery status, and use of healthy controls without psychopathology, provide preliminary evidence that emotion regulation difficulties in AN may only be impaired in the acute phase of the illness, and that improved emotion regulation in recovery from AN may be due to a plethora of factors (e.g., treatment, weight regain, shorter duration of illness) that need to be explored. Whereas emotion regulation deficits appear to be limited to the acute phase of AN, other aspects of emotional functioning, such as sensitivity to others' emotions and difficulty recognizing emotions in others, indicate that individuals may continue to be impaired and that these may be traits of individuals with AN. The range of emotion regulation deficits found in AN, along with Harrison et al.'s (2010b) conclusion that emotion regulation deficits are characteristic of acute AN rather than an enduring trait, warrant further investigation in order to establish how recovery in AN intersects with emotion regulation and other dimensions of emotional functioning that may not improve with recovery (e.g., emotion identification in others).

In contrast to Harrison et al.'s (2010b) finding that those in AN recovery experienced fewer emotion regulation deficits compared to those in the acute phase of the illness, two studies (Brockmeyer et al., 2012; Haynos, Roberto, Martinez, Attia, & Fruzzetti, 2014) produced evidence to the contrary. In the first, Brockmeyer et al.

compared differences in emotion regulation deficits between those with acute AN, those in recovery from AN, and control participants to determine whether those in AN recovery had fewer deficits, and additionally whether BMI was associated with emotion regulation deficits in acute AN. The authors speculated that, in contrast to Harrison et al. (2010b), emotion regulation difficulties would persist in AN recovery and that lower BMIs in acute AN would be associated with fewer emotion regulation deficits based on their hypothesis that food restriction and low BMIs function to compensate for emotion regulation deficits in acute AN.

The sample included 23 inpatients with acute AN and 18 individuals recovered from AN as determined by the following criteria: 1) history of AN as determined by the SCID (First et al., 2002), 2) BMI > 18.5 $kg/m^2$, 3) regular menstruation, 4) normal eating patterns for at least 12 months (method used to determine this was not reported). Eighteen participants with diagnoses of depression or anxiety comprised a clinical control group, and 32 participants without DSM-IV disorders were classified as healthy controls (note: methods used to establish the presence or absence of DSM-IV disorders in the control groups were not reported but it is presumed the SCID was used for this purpose).

All control participants had BMIs within the normal range (18.5 to 25 $kg/m^2$). Participants were Caucasian females who ranged in age from 18 to 45 years old, with those in the acute AN group being significantly younger than the recovered AN and clinical control groups ($p < .01$). The acute AN and clinical control groups had greater depressive symptoms, as measured by the PHQ-9 (Kroenke & Spitzer, 2002), compared to the recovered AN and healthy control groups ($p < .001$).

Emotion regulation deficits were determined by DERS Total scores (Gratz & Roemer, 2004) and results indicated that when controlling for age, differences in emotion regulation were found between groups ($p < .001$). Specifically, the acute AN, recovered AN, and clinical control groups reported significantly greater emotion regulation difficulties compared to the healthy control group, and the acute and recovered AN groups did not significantly differ from one another in the level of emotion regulation difficulties. In acute AN, lower BMIs were positively associated with fewer emotion regulation deficits ($r = .72, p < .001$), supporting the author's hypothesis.

This study indicates that emotion regulation may not be a marker of disease state and provides some support for the notion that certain AN symptoms, such as low body weight, may regulate affect, albeit maladaptive. These findings should be considered in light of certain factors. First, the acute AN group included individuals in inpatient treatment, which points to the severity of their disease. Second, sample sizes across groups were relatively small and so insufficient power may have precluded significant findings between the acute AN and recovered AN groups. Third, the validity of recovery criteria used for the recovered AN group are unknown, and so it is unclear whether the AN recovered group represents others in AN recovery. Replication studies using larger, more heterogeneous samples using validated criteria to establish eating disorder recovery status are needed to strengthen these findings, while the use of longitudinal studies would allow for the study of emotion regulation deficits over periods of illness and recovery. Lastly, publishing the results of DERS subscale scores between groups would have been interesting; it is possible that facets of emotion regulation change between illness and recovery (e.g., individuals may have greater emotional clarity following treatment but

feel ill-equipped to engage in goal-directed behavior when distressed when not actively dieting).

Employing a within-subjects design, Haynos et al. (2014) compared emotion regulation changes before and after weight restoration in a sample of individuals (gender not reported) who sought inpatient treatment for AN. A total of 65 participants completed the DERS (Gratz & Roemer, 2004), BDI-II (Beck et al., 1996), Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988), Clinical Impairment Assessment (CIA; Bohn et al., 2008), and EDE (Fairburn et al., 2008) at treatment admission, and a subset of these participants (n = 51) completed these same measures after weight restoration, which was presumably around the time of hospital discharge.

Results revealed that when using a Bonferroni corrected alpha level of $p < .003$ to control for multiple comparisons, there were significant improvements across all measures ($p$'s < .001) except for the DERS Total ($p = .01$) and subscale scores (Acceptance, $p = .14$; Awareness, $p = .005$; Clarity, $p = .007$; Goals, $p = .02$; Impulsivity, $p = .34$; Strategies, $p = .03$). This parallels Brockmeyer et al.'s (2012) finding that emotion regulation deficits continued to be impaired among those in recovery. In contrast to Brockmeyer et al., however, Haynos et al. (2014) found no significant associations between BMI and emotion regulation: Correlations between BMI and DERS Total and subscale scores both at admission and after weight restoration ranged from -.16 to .08. These discrepant results may be at least partially due to differences in BMI at baseline (Brockmeyer et al.'s sample averaged 14.83 $kg/m^2$ whereas Haynos et al.'s sample averaged 16.06 $kg/m^2$), which has been used as an indicator of AN severity status (APA, 2013). Restriction of range with regard to BMIs and/or DERS scores may also have

influenced the findings. Lastly, there were no observed differences in DERS scores between AN subtypes (AN-R versus AN-BP) at admission ($p$ = .23) or following weight restoration ($p$ = .92).

Haynos et al.'s (2014) study possessed a number of strengths, including a within-subjects design, examination of DERS subscales in addition to the Total score, and use of psychometrically supported instruments. Results provide additional evidence that emotion regulation may continue to be impaired following weight restoration despite improvements in eating disorder psychopathology, depression, anxiety, and functional impairment. However, these findings do not extrapolate to individuals in AN recovery, who in addition to weight restoration meet a number of additional criteria that are often based on several months of sustained improvement in symptoms. Nonetheless, results largely parallel Brockmeyer et al.'s (2012) finding that emotion regulation deficits are not limited to the acute phase of the illness, and support the need for additional research to rectify discrepancies with other studies (e.g., Harrison et al., 2010b) and extend findings to those in recovery from BN and BED. Findings also point to the need for better treatments that specifically target emotion regulation deficits (e.g., EABT; Wildes & Marcus, 2011).

Constructs relevant to emotion regulation have also been explored in eating disorder recovery, though minimally. In one study, participants with active AN reported significantly greater negative beliefs about emotions compared to those in recovery from AN (Oldershaw et al., 2012). Negative beliefs about emotions have been hypothesized to lead to emotional avoidance, which is an aspect of emotion dysregulation associated with eating pathology (Wildes, Ringham, & Marcus, 2010). It is therefore possible that

improvements in emotion-related schemas have implications for emotion regulation. However, additional research is needed to clarify this.

Negative affect, which captures experiences of subjective distress and unpleasant engagement, is a well-established risk and maintenance factor for disordered eating that may have relevance to the eating disorder recovery process. It could be that heightened negative affect is maintained over time via engagement in eating disorder behaviors and that reductions in eating psychopathology lead to decrements in negative affect. Alternatively, if emotion regulation does indeed improve with eating disorder recovery, improved regulation may drive reductions in negative affect, or vice versa. Conversely, negative affect may continue to be elevated among those in eating disorder recovery. If that were true, then heightened negative affect may be a culprit of high relapse rates in eating disorders. To this writer's knowledge, only one study has specifically examined negative affect in relation to eating disorder recovery (Harney et al., 2014).

This study included 96 females with past or present eating disorders who were seen at a pediatric and adolescent specialty clinic and 67 females who were at least 16 years old without histories of eating disorders. It was hypothesized that negative affect would be greatest among those with active eating disorders, followed by those in partial recovery from eating disorders, and lowest among those in full recovery from eating disorders. Additionally, the authors (Harney et al., 2014) hypothesized that those in full recovery from eating disorders would be indistinguishable from a comparison sample.

Lifetime and current eating disorder diagnoses, or lack thereof, were determined by the SCID (First et al., 1995). The Eating Disorders Longitudinal Interval Follow-up Evaluation (Herzog et al., 1993) was used to assess eating disorder behaviors, and the

EDE-Q (Fairburn & Beglin, 1994) captured a range of eating disorder psychopathology. Using eating disorder recovery criteria developed and validated by Bardone-Cone et al. (2010), 20 participants met criteria for full eating disorder recovery (i.e., history of eating disorder; BMI ≥ 18.5 kg/m$^2$; no binge eating, purging, or fasting in the past three months; all EDE-Q subscale scores within one standard deviation of age-matched community norms), 15 met criteria for partial eating disorder recovery (i.e., all fully recovered criteria were met except that at least one EDE-Q subscale was greater than one standard deviation of age-matched community norms), and 53 participants met criteria for current eating disorder diagnoses. With a mean age of 21.8 years (*SD* = 4.28), all participants were female and the majority were Caucasian (91.6%), followed by biracial-ethnic (5.0%), Asian (1.9%), and African American (1.3%). Ethnicity did not differ across groups but age did ($p < .001$), with control participants being significantly younger than the partial eating disorder recovery and full eating disorder recovery participants. Eating disorder groups did not differ with regard to BMI at the start of treatment, lifetime AN diagnoses, and number of years since eating disorder onset (*p*-values not reported).

Negative affect was captured by measures of depression (Center for Epidemiological Studies Depression Scale; Radloff, 1977), anxiety (Spielberger State-Trait Anxiety Inventory; Spielberger, Gorsuch, & Lushene, 1970), loneliness (UCLA Loneliness Scale; Russell, 1996), and perceived stress (Perceived Stress Scale; Cohen, Kamarck, & Mermelstein, 1983). Results revealed that depression, anxiety, and perceived stress scores were significantly higher in the active eating disorder and partial recovered groups compared to the full recovered and control groups (*p*'s < .001). Loneliness was greater in the active eating disorder group compared to the partial recovered, full

recovered, and control groups ($p < .001$). The authors speculated that less loneliness in the partial recovered group may be driven by improved relationships as individuals combat disordered eating patterns while being supported by loved ones and professionals. In time, social support may help to move a subset of those in partial recovery into full recovery. However, experiences of negative affect among those in partial recovery may become intolerable, especially without the use of eating disorder behaviors (e.g., dietary restriction, binge eating, purging) and inadequate emotion regulation skills. This, in turn, may drive relapse.

These results not only corroborate heightened negative affect as a feature of active eating disorders, they suggest that negative affect is unlikely to be elevated among individuals who are fully recovered from eating disorders, at least when measured dimensionally. The fact that the fully recovered and comparison groups were indistinguishable on all measures of negative affect implies that lower levels of negative affect may be a useful marker of full recovery.

This study had several strengths, including the use of validated criteria to determine recovery status, administration of a diagnostic interview to establish eating disorder diagnoses, samples comprised of heterogeneous eating disorder diagnoses, and inclusion of a control sample for comparison purposes. Replication studies that include more demographically heterogeneous samples would be beneficial as Harney et al.'s (2014) sample was relatively homogenous, as would longitudinal designs to illuminate how negative affect changes with eating disorder symptoms over time. Future studies could also consider how different facets of negative affect (e.g., experiences of

guilt/shame) change with recovery and how emotion regulation deficits impact this trajectory.

***Summary.*** Research has established that heightened negative affect and a range of emotion regulation deficits are observed in eating disorders and that treatments targeting emotion regulation, such as DBT for BN (Safer et al., 2009), EABT (Wildes & Marcus, 2011), and ICAT (Wonderlich et al., 2015), may reduce emotion regulation difficulties and negative affect. However, it remains unclear whether emotion-focused interventions outperform other treatments for eating disorders (e.g., CBT-E; Fairburn, 2008), especially with regard to reductions in emotion dysregulation and negative affect. Furthermore, it is unknown whether improvements in these domains persist over longer periods of time (e.g., years as opposed to months).

There have been a few studies that have examined differences in emotion regulation between those with active eating disorders and those in recovery form eating disorders. All of these studies used AN samples and results were mixed: One study (Harrison et al., 2010b) found that those in recovery had fewer emotion regulation deficits than those in the acute phase of the illness and two did not (Brockmeyer et al., 2012; Haynos et al., 2014). Brockmeyer et al. additionally found that lower BMIs in acute AN were associated with fewer emotion regulation deficits, which is surprising in light of prior research demonstrating a link between greater eating disorder psychopathology and greater emotion regulation deficits (Svaldi et al., 2012). In Haynos et al.'s (2014) sample, weight regain was not associated with decreases in emotion regulation deficits despite improvements in anxiety, depression, and eating disorder symptoms.

Collectively, these studies highlight the need for more research on emotion regulation in eating disorder recovery using demographically and diagnostically heterogeneous samples as well as validated recovery criteria. Future studies would also benefit from further exploration of the broad construct of negative affect in eating disorder recovery to either support or refute Harney et al. (2014), who found that negative affect, as determined by dimensional measures of depression, anxiety, stress, and isolation, was heightened among those with active eating disorders but not among those in eating disorder recovery. The current study, which is detailed in subsequent chapters, was designed to overcome several limitations of previous research to determine whether there are differences in facets of emotion regulation and negative affect between those with active eating disorders, those in recovery from eating disorders, and those without histories of eating disorders.

# Chapter 3: Methodology

## Participants

**Inclusion/exclusion criteria.** The sample included individuals who were at least 18 years old and interested in participating in a study examining emotions and eating-related concerns. Validated criteria established by Bardone-Cone et al. (2010) were used to determine whether participants met criteria for the recovered eating disorder (RED), active eating disorder (AED), or comparison (COMP) group. Participants who did not meet criteria for one of the three groups were excluded from study analyses.

The RED group was defined in the following way: 1) lifetime eating disorder diagnosis as determined by the Eating Disorder Diagnostic Scale (EDDS; Stice, Telch, & Rizvi, 2000); 2) current BMI ≥ 18.5 kg/m$^2$; 3) no binge eating, purging (i.e., vomiting or laxative use), or fasting in the previous three months; and 4) EDE-Q (Fairburn & Beglin, 1994) subscale scores within one standard deviation of age-matched community norms. The AED group was defined by a 1) lifetime eating disorder diagnosis as determined by the EDDS; 2) current BMI ≤ 18.5 kg/m$^2$ and/or any binge eating, purging (i.e., vomiting or laxative use), or fasting reported on the EDE-Q; and 3) at least one EDE-Q subscale score greater than one standard deviation of age-matched community norms.

Inclusion in both AED and RED groups required a lifetime eating disorder diagnosis but differed in whether eating disorder symptoms were present in the preceding three months. Those in the RED group denied any binge eating, purging, or fasting in the past three months, had current BMIs ≥ 18.5 kg/m$^2$, and scored in the broad normative range on a measure of eating disorder psychopathology whereas those in the AED group reported binge eating, purging, or fasting in the prior three months and/or had current

BMIs ≤ 18.5 kg/m$^2$, and scored in the clinical range on a measure of eating disorder psychopathology. The COMP group was determined as follows: 1) current BMI ≥ 18.5 kg/m$^2$; 2) no lifetime eating disorder diagnosis as determined by the EDDS; 3) no binge eating, purging (i.e., vomiting or laxative use), or fasting in the previous three months; and 4) all EDE-Q subscale scores within one standard deviation of age-matched community norms. Individuals who did not meet criteria for the AED, RED, or COMP groups were excluded from the analyses.

**Sample size.** A power analysis (Cohen, 1988) for an analysis of covariance with three groups was conducted to determine a sufficient sample size using a two-tailed alpha of .05, power of .80, and a medium effect size. Based on the aforementioned assumptions, the desired sample size is 156, with 52 participants per group. A previous eating disorder online survey study (Pisetsky, Crow, & Peterson, 2015) conducted at the University of Minnesota's Center for Eating Disorders Research recruited approximately 100 participants who were in treatment at The Emily Program, a local treatment center, over four months. Given this success, as well as the fact that the current study was open to individuals regardless of treatment status and geographic location, it was anticipated that it would be feasible to conduct the current study entirely online. Although it was not possible to calculate a return rate for this survey, it was expected that sample size estimates were attainable.

**Participants.** The online survey was open between March 2016 and October 2016. During that time, 1,088 individuals consented to participate in the study. There were not any participants who marked "no" on the statement of consent, although there

were likely a number of individuals who exited the survey after opting not to participate in the study instead of selecting the "no" option.

Of the 618 participants who were excluded from the study, 384 were excluded for incomplete data. A total of 223 participants were excluded from the study because they did not meet inclusion criteria for the AED, RED, or COMP groups. Of these 223 individuals, 73 had Eating Disorder Examination – Questionnaire (EDE-Q) subscale scores greater than one standard deviation of age-matched community norms but no binge eating, purging, fasting, or BMI ≤ 18.5 kg/m$^2$; 40 were excluded due to BMIs ≤ 18.5 kg/m$^2$ and/or binge eating, purging, or fasting in the past month without EDE-Q subscale elevations (i.e., subscale scores were not greater than one standard deviation of age-matched community norms); and 110 were excluded because they reported eating disorder psychopathology (i.e., EDE-Q subscale scores were greater than one standard deviation of age-matched community norms and/or binge eating, purging, fasting, or BMI ≤ 18.5 kg/m$^2$) without meeting lifetime eating disorder diagnostic criteria as determined by the Eating Disorder Diagnostic Scale (EDDS). Six participants who were older than 65 years of age were initially included in the COMP group but ultimately excluded from analyses to reduce outliers that contributed to unequal variances in age across groups. Lastly, because only five participants identified as gender nonconforming, data from these individuals were excluded from analyses due to small expected cell frequencies for chi-square analyses. A total of 470 participants were included for participation in this study, with 269 assigned to the AED group, 58 to the RED group, and 143 to the COMP group.

## Procedure

**Recruitment.** It was originally proposed that recruitment and data collection would occur over a five-month period. However, due to insufficient sample size within that time period, the recruitment window was broadened to approximately seven months, ending on October 31, 2016. Participant recruitment occurred through a number of modalities using both print and online advertisements (see Appendix A for copies of recruitment materials that were approved by the Institutional Review Board). No advertisements were directed at specific individuals.

Printed study flyers were posted on bulletin boards across the University of Minnesota – Twin Cities campus as well as at local private colleges and on community bulletin boards throughout the Minneapolis/St. Paul, Minnesota metropolitan area (e.g., local coffee shops and cafes). Printed flyers were displayed in waiting rooms at The Emily Program and at the University of Minnesota Outpatient Psychiatry Clinic and Department of Psychiatry.

The majority of study recruitment occurred using online advertisements targeting both individuals with and without eating disorders on social media, eating disorder websites, email lists, and for distribution to college counseling center staff. The Emily Program and the University of Minnesota Center for Eating Disorders Research posted study advertisements on their Facebook and Twitter pages, which were subsequently re-posted by other individuals and eating disorder organizations (e.g., University of North Carolina Center of Excellence for Eating Disorders). The study advertisement was also posted on the social news and discussion form website, Reddit, under the "Eating Disorders" and "Eating Disorders Hope" discussion forums, as well as on the "Eating

Disorders Support" discussion webpage of 7 Cups of Tea, a mental health website that offers online counseling and has community chat rooms. Lastly, several attempts were made to post the study advertisement on the National Association for Males with Eating Disorders (NAMED) website; unfortunately, this recruitment outreach was unsuccessful.

Since the majority of information obtained through eating disorders research comes from studies using predominately female, Caucasian samples, several efforts were made for the present study to increase recruitment of gender- and ethnically-diverse individuals. This writer emailed requests to disseminate an electronic version of the study flyer to group members of 123 student groups at the University of Minnesota that advertised themselves as focusing on issues related to ethnic and gender diversity. In addition, this writer contacted several college-counseling centers of four-year public and private U.S. post-secondary institutions that had at least 50% Hispanic enrollment in the 2014-2015 academic year as determined by research conducted through the Hispanic Association of Colleges and Universities (HACUs). Of the 38 schools identified, 22 contained college counseling and/or student health services with valid contact information. This writer emailed and/or called these 22 schools to inform them of the current study and request that an electronic or printed copy of the study flyer be disseminated to counseling center providers and displayed for students. This writer also contacted the top ten by enrollment, four-year Historically Black Colleges and Universities (HBCUs) as determined by Affordable Schools, as well as an additional three HBCUs that were not on this list. See Table 1 below for a list of colleges and universities contacted to increase ethnic minority recruitment.

Table 1

*Four-Year Colleges and Universities Contacted for Ethnic Minority Recruitment.*

| Institution Name | Location |
|---|---|
| HBCUs | |
| Alabama A & M University[a] | Huntsville, AL |
| Alabama State University[a] | Montgomery, AL |
| Florida A & M University | Tallahassee, FL |
| Howard University | Washington, DC |
| Jackson State University | Jackson, MS |
| Morgan State University | Baltimore, MD |
| North Carolina A & T State University | Greensboro, NC |
| North Carolina Central University | Durham, NC |
| Prairie View A & M University | Prairie View, TX |
| Southern University and A & M College | Baton Rouge, LA |
| Spellman College[a] | Atlanta, GA |
| Tennessee State University | Nashville, TN |
| Texas Southern University | Houston, TX |
| HACUs | |
| California State University - Bakersfield | Bakersfield, CA |
| California State University - Dominguez Hills | Carson, CA |
| California State University - Los Angeles | Los Angeles, CA |
| California State University - San Bernardino | San Bernardino, CA |
| Carlos Albizu University - Miami Campus | Doral, FL |
| City College - Miami | Miami, FL |
| City University of New York Bronx Community College[b] | Bronx, NY |
| City University of New York Lehman College | Bronx, NY |
| Florida International University | Miami, FL |
| Imperial Valley College[b] | Imperial, CA |
| Miami Dade College | Miami, FL |
| Morton College[b] | Cicero, IL |
| Mount St. Mary's College | Los Angeles, CA |
| New Mexico State University - Main Campus | Las Cruces, NM |
| Pacific Oaks College | Pasadena, CA |
| South Texas College | McAllen, TX |
| Southwest Texas Junior College[b] | Uvalde, TX |
| Sul Ross State University | Alpine, TX |
| Texas A & M International University | Laredo, TX |
| Texas A & M University - Kingsville | Kingsville, TX |
| Trinity International University - Florida | Miramar, FL |
| University of Texas - Brownsville | Brownsville, TX |
| University of Texas - El Paso | El Paso, TX |

| | |
|---|---|
| University of Texas - Pan American | Edinburg, TX |
| University of Texas - San Antonio | San Antonio, TX |
| University of the Incarnate Word | San Antonio, TX |

*Note*. HBCU = Historically Black Colleges and Universities; HACU = Hispanic Association of Colleges and Universities.

[a] These schools were sent study advertisements but were not included in the top ten list of four-year HBCUs by enrollment.

[b] These schools were two-year, not four-year, public institutions with high Hispanic enrollment rates that were sent study advertisements.

Craig's List, which is a free, online advertising site in which requests for volunteers can be made based on geographic location, was also utilized. Study advertisements were posted to target individuals in the Twin Cities, Minnesota area as well as in the following large, metropolitan areas in order to recruit a more diverse sample: Atlanta, GA; Austin, TX; Boston, MA; Chicago, IL; Dallas, TX; Denver, CO; Washington, DC; San Francisco, CA; Los Angeles, CA; Detroit, MI; Las Vegas, NV; Houston, TX; New York, NY; Miami, FL; Philadelphia, PA; Portland, OR; San Diego, CA; and Seattle, OR.

**Data collection.** Participants who were interested in learning more about the study after viewing a study advertisement were encouraged to go to the secure study website, which was managed by www.SurveyMonkey.com, where they were presented with the consent form containing study details and researcher contact information. After reviewing the consent form, individuals were instructed to check a "yes" or "no" box in response to the following statement: "I certify that I am at least 18 years old. I have read the above information. I have asked questions and have received answers. I consent to participate in the study." Electronic signatures were not collected to protect participant anonymity. Individuals who did not consent by checking the "yes" box were not given access to the remainder of the survey.

The survey was comprised of several assessments of current and past eating pathology, negative affect, emotion regulation, demographic questions, and treatment history. All participants were instructed to complete the same measures. Skip-out questions were included for items that did not apply to the entire sample (e.g., only those

who reported a history of eating disorder treatment were administered items inquiring about what was most helpful in treatment).

At the end of the survey, participants were given the option to input their contact information for entry into a drawing to win a $20 Target gift card. Participants were informed that they had at least 1 in 20 chance of being selected for a gift card and that should they choose to enter into this drawing, their contact information would not be linked with their survey results. A total of 430 participants (39.5% of the sample) entered into the gift card drawing; 22 gift cards were mailed to randomly selected participants after the study was closed for recruitment.

After completing study questions, all participants were taken to a final study page that thanked them for their participation and provided contact information for the student researcher and her adviser. This final page also included links to three national eating disorder websites (i.e., Academy of Eating Disorders, National Eating Disorders Association, E-D-Referral) that contained information about eating disorders and treatment options for participants interested in resources.

**Measures**

Please refer to Appendix B for copies of the following measures:

**Demographics, Eating Disorder, and Treatment Questionnaire.** This form was designed specifically for this study; however, some demographic questions were modified from a previous study (Wonderlich et al., 2014). Of the 19 questions included on this form, five pertain to demographics, five inquire about details related to eating disorder pathology, and nine obtain information about current/past treatment. There are "skip out" options for individuals without past or present eating disorders, as well as

those who never received eating disorder treatment. There were no psychometric data available for this measure.

**Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004).** The DERS is a 36-item self-report questionnaire that reflects various emotion regulation deficits that are based on Gratz and Roemer's emotion regulation model. Each question has a five-point Likert scale response option; certain questions are reverse scored. Question responses are summed to generate a Total score and six subscale scores: 1) non-acceptance of negative emotional responses (Nonacceptance; e.g., "When I'm upset, I feel guilty for feeling that way"), 2) difficulties engaging in goal-directed behavior when upset (Goals; e.g., "When I'm upset, I have difficulty concentrating"), 3) impulse control difficulties when upset (Impulse; e.g., "When I'm upset, I lose control over my behaviors"), 4) lack of emotional awareness (Awareness; e.g., "I am attentive to my feelings" [reverse scored]), 5) limited access to emotion regulation strategies when upset (Strategies; e.g., "When I'm upset, I believe I will remain that way for a long time"), and 6) lack of emotional clarity (Clarity; e.g., "I have difficulty making sense out of my feelings").

The DERS Total and subscale scores have been shown to have adequate to excellent internal consistency in women with AN, BN, and BED ($\alpha$'s = .72-.96; Brockmeyer et al., 2014; Harrison et al., 2010b; Svaldi et al., 2012), mixed-gender samples of adults with BN ($\alpha$'s = .87-.96; Lavender et al., 2014), and non-clinical, mixed-gender samples of undergraduate students ($\alpha$'s = .80-.93; Gratz & Roemer, 2004). Construct and predictive validity have been established in non-clinical, mixed-gender undergraduate students, as has test-retest reliability (DERS total: $r$ = .88, Nonacceptance:

*r* = .69, Goals: *r* = .69, Impulse: *r* = .57, Awareness: *r* = .68, Strategies: *r* = .89, Clarity: *r* = .80). Internal consistency ranged from good to excellent in the current sample (DERS total: α = .97, Nonacceptance: α = .95, Goals: α = .92, Impulse: α = .93, Awareness: α = .89, Strategies: α = .94, Clarity: α = .90).

**Eating Disorder Diagnostic Scale (EDDS; Stice et al., 2000).** The EDDS is a 22-item measure of eating psychopathology that establishes DSM-IV (APA, 1994) diagnoses of AN, BN, and BED based on the previous three months. Some items on this questionnaire use Likert-type scales whereas others require dichotomous or open-ended responses. The EDDS possesses good to excellent test-retest reliability (*r* = .87-.95) in female undergraduates and females with AN, BN, or BED (Krabbenborg et al., 2012), and females aged 13-61 years old who comprised a non-clinical sample (Stice et al., 2000).

As there are no validated, published questionnaires that determine lifetime eating disorder diagnoses, the EDDS was modified for the current study in order to approximate whether study participants met DSM-5 (APA, 2013) eating disorder criteria at some point in their lives. These modifications included updating time frames referenced on this measure and removing items that are no longer relevant to DSM-5 criteria. With regard to the time frame, participants with past or present eating disorders were directed to complete the EDDS during the three most severe months of their eating disorder. Control participants were asked to complete this measure with the previous three months in mind. The two questions assessing menstrual status were excluded from the present study because amenorrhea is no longer a criterion for AN in DSM-5. In addition, since DSM-5 no longer uses the average number of days of binge eating in order to establish frequency

thresholds for BN and BED, the item pertaining to the number of binge eating days was omitted.

**Eating Disorder Examination – Questionnaire (EDE-Q; Fairburn & Beglin, 1994).** This frequently used, 33-item self-report measure of current eating pathology was adapted from the Eating Disorder Examination (Fairburn & Cooper, 1993), an interview-based assessment of eating disorder cognitions and behaviors. Most items use a six-point Likert scale, with higher numbers corresponding to more severe eating-related pathology. There are also a number of questions assessing the frequency of various eating disorder behaviors, including binge eating, laxative use, and driven/compelled exercise. The EDE-Q generates a global scale and four subscale scores. The Restraint subscale captures attempts to control eating. The Eating Concern subscale includes items assessing preoccupation with eating, discomfort eating in social situations, fear of losing control over eating, and guilt about eating. The Shape Concern and Weight Concern subscales are each comprised of a range of items that assess the importance of, and discomfort with one's shape (i.e., one's figure) and weight (i.e., the number on the scale). Three items assessing menstrual status on the EDE-Q were not administered in the current study since amenorrhea is no longer a criterion for AN in DSM-5. In addition, the item ascertaining the number of days in the last month that binge eating occurred (item 15) was adjusted to obtain the number of episodes in the last month that binge eating occurred in order to be more consistent with DSM-5 criteria.

Acceptable to excellent levels of internal consistency were found for the total and subscale scores in samples of male undergraduate students ($\alpha$'s = .80-.94; Lavender et al., 2010) and female undergraduate students ($\alpha$'s = .78-.93; Bardone-Cone & Boyd, 2007;

Luce & Crowther, 1999; Mond, Hay, Rodgers, Owen, & Beumont, 2004). The test-retest correlation for large binge eating episodes, which are called "objective bulimic episodes" on the EDE-Q, was found to be .84 in a mixed-gender sample of adults with BED (Luce & Crowther, 1999; Reas, Grilo, & Masheb, 2006), while test-retest correlations for subscales have ranged from .66-.77 in the aforementioned BED sample and .81-.94 in a sample of undergraduate women (Luce & Crowther, 1999). In a review of the psychometric properties of the EDE-Q, Berg, Peterson, Frazier, and Crow (Berg, Peterson, Frazier, & Crow, 2012) found support for the reliability and validity of this measure; however, it was noted that future research is needed to support the use of the EDE-Q in more diverse populations (e.g., men and adolescents) and to reliably assess certain eating disorder behaviors such as laxative use, diuretic use, and excessive exercise. In the current sample, internal consistency ranged from good to excellent (Global, $\alpha = .961$; Restraint, $\alpha = .878$; Eating Concern, $\alpha = .875$; Shape Concern, $\alpha = .927$; Weight Concern, $\alpha = .861$).

**Emotion Regulation Questionnaire (ERQ; Gross & John, 2003).** The ERQ is a 10-item measure that uses a seven-point Likert scale to assess the extent to which two emotion regulation strategies are habitually used, cognitive reappraisal (e.g. "I control my emotions by changing the way I think about the situation I'm in") and expressive suppression (e.g., "I control my emotions by not expressing them"). Cognitive reappraisal involves reinterpreting the meaning of an emotional stimulus in order to modulate one's emotional response and is associated with a number of positive outcomes, including greater self-esteem and life satisfaction, and fewer depressive symptoms. Expressive suppression, in contrast, describes efforts to inhibit emotion-expressive behavior (Gross,

1998). Engagement in this strategy is linked to increased depressive symptoms, reduced quality of life, and lower self-esteem.

The test-retest reliability for both subscales was found to be .69, and internal consistencies were .79 for reappraisal and .73 for suppression. The subscale inter-correlation of -.01 suggests that reappraisal and suppression are distinct constructs. Convergent and discriminate validity have also been established for this measure. The aforementioned psychometric data was based on samples comprised of mixed-gender undergraduate students (Gross & John, 2003). Internal consistency in the current sample was .90 for the Cognitive Reappraisal subscale and .84 for the Expressive Suppression subscale.

**Positive and Negative Affect Scale – Expanded Form (PANAS-X; Watson & Clark, 1999).** This 60-item questionnaire measuring dimensions of negative and positive affect has respondents rate the extent to which they are experiencing various affective states on a five-point Likert scale. The PANAS-X yields overall positive and negative affect scores, as well as subscale scores for specific facets of negative affect (i.e., fear, hostility, guilt, sadness) and positive affect (i.e., joviality, self-assurance, attentiveness). In addition to the 39 items that comprise the aforementioned scales, there are an additional 21 items that capture other affective states, including shyness, fatigue, serenity, and surprise. These 21 items were not administered in the present study to reduce participant burden as they were not central to the study hypotheses.

The PANAS-X has extensive psychometric support, including acceptable to excellent internal consistency ($\alpha$'s = .72-.94) and acceptable test-retest reliability ($r$ = .71) in mixed-gender samples of undergraduates and college employees, psychiatric

inpatients, and heterogeneous adult samples (see review by Watson & Clark, 1999). In the present sample, internal consistency ranged from good to excellent (negative affect: $\alpha$ = .91, positive affect: $\alpha$ = .86, fear: $\alpha$ = .91, hostility: $\alpha$ = .86, guilt: $\alpha$ = .96, sadness: $\alpha$ = .93, joviality: $\alpha$ = .95, self-assurance: $\alpha$ = .85, attentiveness: $\alpha$ = .81).

**Data Analysis**

**Demographic variables.** Chi-square analyses were used for categorical variables and one-way analyses of variance (ANOVA) were used for continuous variables across the three groups. Clinical significance was established for *p*-values < .05 across all analyses unless otherwise stated.

**$H_0$ 1.1** The first null hypothesis was that there are no differences in overall emotion dysregulation between the AED, RED, and COMP groups when controlling for negative affect. An analysis of covariance (ANCOVA) was used to test this hypothesis, with participant group as the independent variable and the DERS total score as the dependent variable. The PANAS-X negative affect subscale score was included as a covariate in this model because negative affect has been significantly associated with emotion dysregulation (e.g., Gross & John, 2003; Tortella-Feliu et al., 2010).

**$H_0$ 1.2** This null hypothesis assumed there are no differences in facets of emotion regulation between the AED, RED, and COMP groups when controlling for negative affect. In order to test this hypothesis, several ANCOVAs were run, with each including participant group as the independent variable, PANAS-X negative affect subscale score as a covariate, and emotion regulation subscale score as the dependent variable. To control for Type 1 error, corrected alpha levels were used for post-hoc analyses.

**$H_0$ 2.1** This null hypothesis specified that, when controlling for gender, negative affect does not significantly differ between the RED, AED, and COMP groups. To test this hypothesis, an ANCOVA was conducted with participant group as the independent variable and the PANAS-X negative affect subscale score as the dependent variable. Gender was included as a covariate due to evidence that women tend to experience more negative affect than men (Fujita et al., 1991).

**$H_0$ 2.2** Several ANCOVAs were conducted to test the null hypothesis that, when controlling for gender, facets of negative affect (i.e., fear, hostility, guilt, sadness) do not significantly differ between the RED, AED, and COMP groups. Each ANCOVA analysis included participant group as the independent variable, gender as a covariate, and PANAS-X negative affect subscale score as the dependent variable. To control for Type 1 error, corrected alpha levels were used for post-hoc analyses.

## Chapter 4: Results

A total of 470 participants were included for participation in this study, with 269 assigned to the active eating disorder (AED) group, 58 to the recovered eating disorder (RED) group, and 143 to the comparison (COMP) group. As detailed in Chapter 3, of the 618 participants who were excluded from the study, 384 were excluded for incomplete data; 223 were excluded because they did not meet inclusion criteria for the AED, RED, or COMP groups; six were excluded due to age greater than 65 years old (in order to reduce outliers that contributed to unequal variances in age across groups); and five were excluded because they identified as gender nonconforming (due to small expected cell frequencies).

### Demographic Variables

The age of the total sample (N= 470) ranged from 18 to 61 years ($M$ = 30.34, $SD$ = 9.45) and significantly differed between the AED (n = 269), RED (n = 58), and COMP (n = 143) groups, $F(2, 467) = 19.36$, $p < .001$. Post-hoc analyses with Bonferroni corrections revealed the COMP group ($M$ = 34.18 years, $SD$ = 9.54) was significantly older than the AED ($M$ = 28.32 years, $SD$ = 9.24; $p < .001$) and RED ($M$ = 30.26 years, $SD$ = 7.12; $p = .018$) groups.

As reflected in Table 2 (see below), there were significant differences in gender across groups, with the majority of participants identifying as women (n = 447, 95.1%). The majority of participants identified as Caucasian (n = 410, 87.2%), followed by mixed race (n = 22, 4.7%), Asian American (n = 17, 3.6%), Hispanic/Latino (n = 8, 1.7%), International (n = 7; 1.5%), American Indian (n = 3, 0.6%), Black American (n = 2, 0.4%), and "other" (n = 1, 0.2%). There were no significant group differences with regard

to the number of Caucasian versus non-Caucasian (i.e., compilation of all other racial identity groups) participants (see Table 2).

There were significant differences between the AED, RED, and COMP groups with regard to primary social role and education (see Table 2). Across groups, most participants were employed, followed by participants identifying as students, as "other" (e.g., multiple roles and/or retired), and lastly, as unemployed. There was a higher proportion of students in the AED group versus the RED and COMP groups, and a higher proportion of employment in the COMP group compared to the AED and RED groups. The majority of participants held at least a two- or four-year college degree (73.6%).

There were no significant differences between eligible and ineligible participants with regard to age, $t(901) = -1.216$, $p = .224$; racial identity, $X^2$ $(1, N = 909) = 1.406$, $p = .236$; primary social role, $X^2$ $(3, N = 908) = 1.383$, $p = .710$; or education, $X^2$ $(2, N = 897) = 2.722$, $p = .256$. There were significant differences with regard to gender between eligible and ineligible participants, $X^2$ $(2, N = 909) = 9.946$, $p = .007$, with more individuals identifying as gender nonconforming in the ineligible ($n = 9$, 2.1%) versus eligible ($n = 0$, 0.0%) group. There was a slightly higher percentage of men in the ineligible ($n = 24$, 5.5%) versus eligible ($n = 23$, 4.9%) group, and more women in the eligible ($n = 447$, 95.1%) versus ineligible ($n = 406$, 92.5%) group.

Table 2

*Demographic Characteristics*.

| Variable | AED n (%) | RED n (%) | COMP n (%) | $\chi^2$ | *p* |
|---|---|---|---|---|---|
| *Gender identity* | | | | | |
| Woman | 259 (96.3) | 58 (100.0) | 130 (90.9) | 9.197 | .010 |
| Man | 10 (3.7) | 0 (0.0) | 13 (9.1) | | |
| *Racial identity* | | | | | |
| Caucasian | 236 (87.7) | 54 (93.1) | 120 (83.9) | 3.268 | .195 |
| Non-Caucasian | 33 (12.3) | 4 (6.9) | 23 (16.1) | | |
| *Primary role* | | | | | |
| Student | 87 (32.5) | 13 (22.4) | 25 (17.5) | 24.712 | .000 |
| Employed | 136 (50.7) | 38 (65.5) | 104 (72.7) | | |
| Unemployed | 18 (6.7) | 0 (0.0) | 3 (2.1) | | |
| Other | 27 (10.1) | 7 (12.1) | 11 (7.7) | | |
| *Education level* | | | | | |
| High school or less | 104 (39.8) | 7 (12.1) | 11 (7.7) | 88.280 | .000 |
| College degree | 118 (45.2) | 28 (48.3) | 57 (39.9) | | |
| Graduate degree | 39 (14.9) | 23 (39.7) | 75 (52.4) | | |

*Note*. AED = Active eating disorder group; COMP = Comparison group; RED = Recovered eating disorder group.

**Treatment and Eating Disorder Diagnostic Characteristics between Groups**

There were significant differences in lifetime psychological treatment (e.g., counseling or therapy) for non-eating disorder related issues between AED, RED, and COMP groups, $X^2$ (2, $N$ = 469) = 30.159, $p$ < .001. Across groups, more than half of participants reported a history of seeking psychological treatment (AED: n = 215, 80.2%; RED: n = 42, 72.4%; COMP: n = 78, 54.5%) while less than half denied a history of psychological treatment (AED: n = 53, 19.8%; RED: n = 16, 27.6%; COMP: n = 65, 45.5%). There were significant differences in current use of psychotropic medications between groups, $X^2$ (2, $N$ = 469) = 36.003, $p$ < .001, with more participants in the AED group (n = 138, 51.3%) using psychotropic medications compared to the RED (n = 21, 36.8%) and COMP (n = 30, 21.0%) groups. The majority of participants in the RED (n = 36, 63.2%) and COMP (n = 113, 79.0%) groups denied current use of psychotropic medications in comparison to the AED group (n = 131, 48.7%).

Lifetime eating disorder diagnosis was determined using algorithms from the EDDS (Stice et al., 2000) that were based on participants' responses to items based on the three most severe months of their eating disorder. There were no significant differences between the AED and RED groups with regard to lifetime eating disorder diagnosis, $X^2$ (4, $N$ = 327) = 2.958, $p$ = .565. Based on EDDS algorithms, the AED group participants were assigned the following diagnoses: anorexia nervosa (n = 93, 34.6%), bulimia nervosa (n = 101, 37.5%), binge eating disorder (n = 14, 5.2%), ayptical anorexia (n = 41, 15.2%), and night eating syndrome, which involves excessive food consumption after the evening meal or after awakening from sleep that causes distress (n = 20, 7.4%). Diagnoses for the RED group, which were also based on EDDS algorithms, were as

follows: anorexia nervosa (n = 22, 37.9%), bulimia nervosa (n = 22, 37.9%), binge eating disorder (n = 1, 1.7%), ayptical anorexia (n = 11, 19.0%), and night eating syndrome (n = 2, 3.4%). The AED group reported a longer duration of eating disorder symptoms ($M$ = 11.50, $SD$ = 8.81) compared to the RED group ($M$ = 7.77, $SD$ = 4.24), $t(314) = 3.175$, $p <$ .001. The RED group averaged 6.86 ($SD$ = 6.40) years in recovery from eating disorder symptoms. A total of 164 (61.0%) AED and 42 (73.7%) RED participants reported a history of seeking eating disorder treatment whereas 105 (39.0%) AED and 15 (26.3%) RED participants never sought eating disorder treatment.

**Hypothesis Testing**

**$H_0$ 1.1** The first null hypothesis was that there are no differences in overall emotion dysregulation between the AED, RED, and COMP groups when controlling for negative affect. An analysis of covariance (ANCOVA) was used to test this hypothesis, with participant group as the independent variable and the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) total score as the dependent variable. The Positive and Negative Affect Scale – Expanded Form (PANAS-X; Watson & Clark, 1999) negative affect subscale score was included as a covariate in this model because negative affect has been significantly associated with emotion dysregulation (e.g., Gross & John, 2003; Tortella-Feliu et al., 2010).

**$H_0$ 1.1 results.** After adjusting for negative affect, there were significant differences in DERS Total scores between AED, RED, and COMP groups, $F(2, 466) = 89.975$, $p < .001$, partial $\eta^2 = .272$. Therefore, the null hypothesis was rejected. Post-hoc comparisons with Bonferroni corrections revealed that DERS Total scores were significantly higher in the AED group (adjusted $M$ = 106.72, $SE$ = 1.30) compared to the

RED group (adjusted $M = 80.09$, $SE = 2.59$) and COMP group (adjusted $M = 76.63$, $SE = 1.82$), $p$'s < .001. There were no significant differences between the RED and COMP groups on DERS Total scores ($p = .763$). The inclusion of age as covariate, in addition to negative affect, produced similar results, $F(2, 465) = 37.393$, $p < .001$, partial $\eta^2 = .139$. The AED group continued to score significantly higher on the DERS total score compared to the RED and COMP groups ($p$'s < .001) whereas the RED and COMP groups scored similarly ($p = 1.000$) when both age and negative affect were included as covariates.

**$H_0$ 1.2** This null hypothesis stated there are no differences in facets of emotion regulation between the AED, RED, and COMP groups when controlling for negative affect. In order to test this hypothesis, several ANCOVAs were run, with each including participant group as the independent variable, PANAS-X (Watson & Clark, 1999) negative affect subscale score as a covariate, and emotion regulation subscale score as the dependent variable. To control for Type 1 error, corrected alpha levels were used for post-hoc analyses.

**$H_0$ 1.2 results.** The null hypothesis was rejected as there were statistically significant group differences across all six DERS (Gratz & Roemer, 2004) and two ERQ (Gross & John, 2003) subscales when controlling for negative affect: DERS Nonacceptance, $F(2, 466) = 41.256$, $p < .001$, partial $\eta^2 = .150$; DERS Goals, $F(2, 466) = 25.543$, $p < .001$, partial $\eta^2 = .088$; DERS Impulse, $F(2, 466) = 50.205$, $p < .001$, partial $\eta^2 = .177$; DERS Awareness, $F(2, 466) = 31.072$, $p < .001$, partial $\eta^2 = .118$; DERS Strategies, $F(2, 466) = 74.776$, $p < .001$, partial $\eta^2 = .243$; DERS Clarity, $F(2, 466) =$

36.625, $p < .001$, partial $\eta^2 = .123$; ERQ Reappraisal, $F(2, 456) = 9.045$, $p < .001$, partial $\eta^2 = .038$; and ERQ Suppression, $F(2, 456) = 35.825$, $p < .001$, partial $\eta^2 = .136$.

Pairwise comparisons with Bonferroni adjusted *p*-values were conducted for all subscales (see below for Table 3 that lists means and adjusted means). The AED group scored significantly higher than the RED group and the COMP group across all DERS subscales and the ERQ Suppression subscale (*p*'s < .001). On the ERQ Reappraisal subscale, the AED group scored significantly lower than the AED ($p < .001$) and COMP ($p = .039$) group. The RED and COMP groups did not significantly differ in DERS and ERQ subscale scores: Nonacceptance, $p = 1.000$; Goals, $p = 1.000$; Impulse, $p = 1.000$; Awareness, $p = 1.000$; Strategies, $p = .220$; Clarity, $p = .672$; Reappraisal, $p = .110$; and Suppression, $p = 1.000$. Results were comparable when both age and negative affect were included as covariates except that the RED group scored significantly higher on the ERQ Reappraisal subscale compared to the COMP group ($p = .035$).

Table 3

*Means, Adjusted Means, Standard Deviations, and Standard Errors for the DERS and ERQ Subscales Scores Across Groups.*

| Subscale | | Group | | |
|---|---|---|---|---|
| | | AED | RED | COMP |
| DERS Nonacceptance | *M* (*SD*) | 19.31 (6.13) | 11.95 (4.87) | 10.50 (4.75) |
| | $M_{adj}$ (*SE*) | 18.01 (0.35) | 13.12 (0.69) | 12.47 (0.49) |
| DERS Goals | *M* (*SD*) | 18.07 (4.83) | 13.14 (4.51) | 12.52 (3.96) |
| | $M_{adj}$ (*SE*) | 17.18 (0.29) | 13.95 (0.57) | 13.88 (0.40) |
| DERS Impulse | *M* (*SD*) | 17.31 (5.94) | 10.12 (4.04) | 8.77 (3.06) |
| | $M_{adj}$ (*SE*) | 16.05 (0.31) | 11.26 (0.61) | 10.68 (0.43) |
| DERS Awareness | *M* (*SD*) | 18.94 (5.23) | 13.33 (4.63) | 12.99 (4.57) |
| | $M_{adj}$ (*SE*) | 18.30 (0.33) | 13.91 (0.65) | 13.97 (0.46) |
| DERS Strategies | *M* (*SD*) | 25.20 (7.19) | 15.26 (5.97) | 12.61 (3.94) |
| | $M_{adj}$ (*SE*) | 23.37 (0.37) | 16.91 (0.73) | 15.38 (0.51) |
| DERS Clarity | *M* (*SD*) | 14.73 (4.55) | 10.12 (3.61) | 8.86 (2.75) |
| | $M_{adj}$ (*SE*) | 13.82 (0.25) | 10.95 (0.49) | 10.24 (0.35) |
| ERQ Reappraisal | *M* (*SD*) | 4.06 (1.28) | 5.21 (0.98) | 4.96 (1.08) |
| | $M_{adj}$ (*SE*) | 4.27 (0.80) | 5.01 (0.15) | 4.63 (0.11) |
| ERQ Suppression | *M* (*SD*) | 4.16 (1.31) | 2.82 (1.23) | 2.59 (1.10) |
| | $M_{adj}$ (*SE*) | 4.03 (0.08) | 2.94 (0.17) | 2.78 (0.12) |

*Note*. AED = Active eating disorder group; COMP = Comparison group; DERS = Difficulties in Emotion Regulation Scale; ERQ = Emotion Regulation Questionnaire; RED = Recovered eating disorder group.

**$H_0$ 2.1** This null hypothesis specified that, when controlling for gender, negative affect will not significantly differ between the RED, AED, and COMP groups. To test this hypothesis, an ANCOVA was conducted with participant group as the independent variable and the PANAS-X (Watson & Clark, 1999) negative affect subscale score as the dependent variable. Gender was included as a covariate due to evidence that women tend to experience more negative affect than men (Fujita et al., 1991).

**$H_0$ 2.1 results.** This null hypothesis was rejected. Scores on the PANAS-X Negative Affect scale significantly differed between groups when controlling for gender, $F(2, 466) = 116.552$, $p < .001$, partial $\eta^2 = .333$. Post-hoc comparisons with Bonferroni corrections revealed that PANAS-X Negative Affect scale scores were significantly higher in the AED group (adjusted $M = 2.49$, $SE = 0.05$) compared to the RED group (adjusted $M = 1.63$, $SE = 0.10$) and COMP group (adjusted $M = 1.36$, $SE = 0.06$), $p$'s < .001. There were no significant differences between the RED and COMP groups on the PANAS-X Negative Affect scale ($p = .058$). Findings remained comparable when age replaced gender as a covariate, $F(2, 466) = 98.758$, $p < .001$, partial $\eta^2 = .298$.

**$H_0$ 2.2** Several ANCOVAs were conducted to test the null hypothesis that, when controlling for gender, facets of negative affect (i.e., fear, hostility, guilt, sadness) will not significantly differ between the RED, AED, and COMP groups. Each ANCOVA analysis included participant group as the independent variable, gender as a covariate, and PANAS-X (Watson & Clark, 1999) negative affect scale score as the dependent variable. To control for Type 1 error, corrected alpha levels were used for post-hoc analyses.

**$H_0$ 2.2 results.** This null hypothesis was rejected. PANAS-X scores significantly differed between groups for Fear, $F(2, 466) = 70.084$, $p < .001$, partial $\eta^2 = .231$; Hostility, $F(2, 466) = 99.867$, $p < .001$, partial $\eta^2 = .300$; Guilt, $F(2, 466) = 222.117$, $p < .001$, partial $\eta^2 = .488$; and Sadness, $F(2, 466) = 122.447$, $p < .001$, partial $\eta^2 = .344$. Posthoc comparisons with Bonferroni corrections showed that the AED group reported significantly more fear, hostility, guilt, and sadness compared the RED group and COMP group ($p$'s < .001). The RED and COMP groups did not significantly differ with regard to fear ($p = .405$), hostility ($p = .607$), guilt ($p = .078$), and sadness ($p = .221$). See Table 4 for descriptive characteristics of facets of negative affect across groups.

Table 4

*Means, Adjusted Means, Standard Deviations, and Standard Errors for the PANAS-X Subscales Scores Across Groups*.

| Subscale | | Group | | |
|---|---|---|---|---|
| | | AED | RED | COMP |
| Fear | *M* (*SD*) | 2.27 (0.99) | 1.52 (0.58) | 1.33 (0.43) |
| | $M_{adj}$ (*SE*) | 2.27 (0.05) | 1.52 (0.11) | 1.33 (0.07) |
| Hostility | *M* (*SD*) | 2.27 (0.89) | 1.42 (0.46) | 1.87 (0.86) |
| | $M_{adj}$ (*SE*) | 2.27 (0.04) | 1.42 (0.10) | 1.28 (0.06) |
| Guilt | *M* (*SD*) | 3.14 (1.13) | 1.58 (0.64) | 1.27 (0.41) |
| | $M_{adj}$ (*SE*) | 3.14 (0.06) | 1.59 (0.12) | 1.27 (0.08) |
| Sadness | *M* (*SD*) | 2.89 (1.12) | 1.71 (0.77) | 1.45 (0.54) |
| | $M_{adj}$ (*SE*) | 2.89 (0.06) | 1.71 (0.12) | 1.45 (0.08) |

*Note*. AED = Active eating disorder group; COMP = Comparison group; PANAS-X = Positive and Negative Affect Scale – Expanded Version; RED = Recovered eating disorder group.

# Chapter 5: Summary, Discussion, and Implications

## Summary

There is evidence that individuals with eating disorders experience a range of emotion regulation deficits that include difficulties identifying, experiencing, and accepting emotions, as well as difficulty controlling impulses when upset and pursuing goals when experiencing negative emotions (Brockmeyer et al., 2014; Gianini et al., 2013; Harrison et al., 2010a; Lavender et al., 2015; Ruscitti et al., 2016; Svaldi et al., 2012). These difficulties, coupled with heightened negative affect, have led to affect regulation models of disordered eating that implicate eating disorder behaviors, such as binge eating, as functioning to regulate aversive affect states (Hawkins & Clement, 1984; Wonderlich et al., 2008; see also Haedt-Matt & Keel, 2011). Converging lines of research provide support for this model as they have demonstrated greater negative affect prior to engagement in certain disordered eating behaviors and reductions thereafter (Berg et al., 2013; Berg et al., 2015; Crosby et al., 2009; Engel et al., 2013; Smyth et al., 2007).

Treatment interventions that target emotion regulation have been designed based on affect regulation models of eating disorders, and are contingent on the assumption that targeting emotion dysregulation and negative affect will contribute to improvements in eating disorder psychopathology. Indeed, preliminary evidence indicates that emotion regulation improves with certain treatments for eating disorders (Peterson et al., 2017; Rowsell et al., 2016; Safer et al., 2010; Wallace et al., 2014); however, the exact mechanisms of how treatment affects emotion regulation remain unclear. Additionally, due to lack of research, it is not yet known whether improvements in emotion regulation persist over extended periods of time, as well as whether emotion regulation deficits

characterize individuals in recovery from eating disorders who have not received specific eating disorder interventions. Establishing a clearer understanding of emotion regulation among individuals in recovery from eating disorders is therefore a logical next step.

This study was designed to determine whether differences in emotion regulation and negative affect exist between individuals in recovery from eating disorders compared to individuals with active eating disorders and individuals without eating disorder histories. Participants included 269 adults with active eating disorders (AED), 58 adults in recovery from eating disorders (RED), and 143 adults without past or present eating disorders (COMP) who completed several online questionnaires that assessed eating psychopathology, emotion regulation, negative affect, and demographic variables.

Findings revealed that, when controlling for negative affect, which has been positively associated with emotion regulation difficulties (Tortella-Feliu et al., 2010), individuals with active eating disorders experienced significantly greater emotion dysregulation compared to individuals in recovery from eating disorders and individuals without past or present eating disorders. This same pattern was found when facets of emotion regulation were examined: Individuals with active eating disorders were less likely to be aware of their emotions and had greater difficulty identifying emotions and accepting negative emotions compared to those in recovery from eating disorders and control participants. Furthermore, the AED group reported less access to adaptive emotion regulation strategies, more difficulty inhibiting impulses when upset, and greater difficulties engaging in goal-directed behavior when upset in comparison to the RED and COMP groups. The AED group was also more likely to engage in experiential suppression, which according to Gross (1998) is a maladaptive emotion regulation

strategy that describes efforts to inhibit emotion-expressive behavior (e.g., trying to control emotions by not expressing them), and less likely to use cognitive reappraisal, an adaptive emotion regulation strategy that involves reinterpreting the meaning of an emotional stimulus in order to modulate one's emotional response (Gross & John, 2003), compared to the RED and COMP groups. The aforementioned findings persisted when age (COMP participants were significantly older than AED and RED participants) was included as a covariate.

Similar results emerged for negative affect, which was assessed using a measure (Positive & Negative Affect Scale – Expanded Version; Watson & Clark, 1999) that examined the extent to which participants experienced various emotions that collectively comprised a negative affective state. The AED group reported significantly greater negative affect compared to the RED and COMP groups when controlling for gender as well as age. Fear, guilt, hostility, and sadness were four dimensions of negative affect that were also examined across groups to determine if certain affective states that have been identified as salient to engagement in eating disorder behaviors (Berg et al., 2013; Berg et al., 2015) were elevated among those in recovery from eating disorders. The AED group reported significantly more fear, guilt, hostility, and sadness compared to the RED and COMP groups, who were indistinguishable from one another.

Collectively, study results demonstrate that individuals with active eating disorders experience significantly greater emotion dysregulation and negative affect compared to individuals in recovery from eating disorders and compared to individuals without histories of eating disorders. Findings from the current study also suggest that

individuals in recovery from eating disorders experience similar rates of negative affect and emotion dysregulation compared to individuals without eating disorder histories.

**Discussion**

To this researcher's knowledge, this is the first study to comprehensively examine a range of emotion regulation difficulties in a diagnostically heterogeneous sample of individuals in recovery from eating disorders. Results extend the existing literature on emotion regulation, negative affect, and eating disorders in several ways, which are outlined below.

Heightened negative affect and notable emotion regulation deficits in the AED group provide evidence for maintenance models of eating pathology, which propose that eating disorder symptoms function to regulate negative affect ((Hawkins & Clement, 1984; Wonderlich et al., 2008; see also Haedt-Matt & Keel, 2011). The absence of heightened negative affect and emotion dysregulation in the RED group, who additionally denied any notable eating disorder psychopathology, also supports affect regulation models because without heightened negative affect and emotion regulation deficits, there is no longer a need to rely on eating disorder psychopathology to regulate aversive emotions.

There has been limited research on emotion regulation in eating disorder recovery, which is perhaps in part due to the lack of consensus in defining recovery from eating disorders (Bardone-Cone et al., 2010). Of the three studies identified by this researcher (Brockmeyer et al., 2012; Harrison et al., 2010b; Haynos et al., 2014), all samples were comprised of individuals with histories of anorexia nervosa (AN). This therefore limits generalizability of results to the broader spectrum of eating disorders and,

furthermore, findings thus far have been mixed. The results of the current study most closely parallel findings by Harrison et al. (2010b), who reported that females in recovery from AN experienced significantly less emotion dysregulation than individuals with acute AN and did not differ from a comparison group with regard to emotion dysregulation. In contrast, Brockmeyer et al. (2012) failed to identify differences in emotion regulation between acute AN and recovered AN groups, although results may have differed if they applied more stringent criteria to establish the eating disorder recovery group since they relied on behavioral criteria only. The current study results also contrast with Haynos et al. (2014), who failed to find improvements in emotion regulation upon weight restoration in an inpatient program. Similar to Brockmeyer et al., discrepancies between the current study and Haynos et al. may be accounted for by the fact that the Haynos et al. sample was not fully recovered from AN.

In the current study, the RED group was comprised of a heterogeneous group of individuals who had varying treatment histories and historical eating disorder diagnoses, yet despite this, the RED group reported comparable emotional regulation to the COMP group. It is possible that results would have differed if subgroups of individuals in recovery form eating disorders were examined in relation to a comparison sample (e.g., individuals with more severe eating disorder histories may have slightly poorer emotion regulation compared to individuals without histories of eating disorders). There were no reported deficits in any facets of emotion regulation, in contrast to the AED group, who reported difficulties with all facets of emotion regulation. Although the cross-sectional nature of this study cannot detect this, it seems likely that part of the recovery journey involves the acquisition of emotion regulation skills. Determining how an individual

transitions from broad impairments in emotion regulation to no notable deficits is a critical next step in order to refine treatments, which may assist individuals in achieving recovery from eating disorders in shorter periods of time, thereby reducing costs associated with this illness.

In the current study, heightened negative affect, as well as greater fear, guilt, hostility, and sadness, were observed in the AED group but not the RED and COMP groups. This is similar to Harney et al. (2014), who examined dimensions of negative affect in relation to recovery from eating disorders and found that depression, anxiety, stress, and loneliness were significantly higher in their active eating disorder and partially recovered groups compared to their fully recovered and comparison groups. Although the current study examined different dimensions of negative affect, findings were identical and suggest that negative affect may be captured in a variety of ways depending on the focus of the study.

The current study found that all four facets of negative affect examined, which included guilt, hostility, fear, and sadness, were significantly lower in the RED and COMP groups compared to the AED group. Although all four facets were elevated in the AED group, it is worth noting that descriptively, the guilt subscale was slightly more elevated than the other three subscales. Future research may benefit from more closely examining these affective states in relation to one another among individuals with acute eating disorders to extend findings by Berg et al. (2013), who identified that guilt may be a particularly salient emotion that is regulated by eating disorder behavior.

The finding that individuals in recovery from eating disorders do not experience notable emotion regulation deficits (or heightened negative affect) indicates that emotion

dysregulation may be best characterized as a marker of the acute state of the illness, and not an enduring trait (Harrison et al., 2010b). Improvements in emotion regulation could be used as a marker of recovery, although more research is needed to clarify the trajectory of changes in emotion regulation over time and how emotion regulation skills are acquired. Both Peterson et al. (2017) and Racine and Wildes (2014) found evidence that changes in emotion regulation predicted improvements in eating disorder psychopathology at subsequent time points. Determining specific interventions as well as other treatment factors (e.g., therapeutic relationship, reductions in eating disorder behaviors) that contribute to improvements in emotion regulation is a critical next step in treatment outcome research. Continuing to focus on emotion-focused interventions that directly target emotion regulation deficits is warranted. With that said, exploring how other interventions impact emotion regulation is also fruitful given evidence that a range of treatments can lead to improvements in emotion regulation (Peterson et al., 2017; Rowsell et al., 2016; Safer et al., 2010; Wallace et al., 2014). Common factors in psychotherapy may account for improvements in emotion regulation across treatments (Wampold, 2015).

Examining changes in negative affect would also be useful as it is possible that decreases in negative affect drive improvements in emotion regulation, or vice versa. The influence of improvements in eating disorder psychopathology should also be considered in relation to changes in emotion regulation and negative affect. Although previous research has identified that emotion regulation predicts improvements in subsequent eating disorder psychopathology (Peterson et al., 2017; Racine & Wildes, 2014; Wallace et al., 2014), it is possible this relationship is actually bidirectional. For example, an

individual with AN who transitions to eating three meals per day instead of engaging in extreme caloric restriction may feel less depressed due to nutritional rehabilitation and, in turn, experience more clarity in their emotions. This may then facilitate additional improvements in eating disorder psychopathology, which may lead to further decrements in negative affect and improved emotion regulation.

**Strengths and Limitations of the Study**

This study possessed several strengths that bolstered findings and extended previous research on emotion regulation and negative affect in eating disorder recovery. The inclusion of a diagnostically heterogeneous sample allowed for generalizability of results to those not just meeting strict diagnostic criteria for anorexia nervosa, bulimia nervosa, or binge eating disorder, but also to those with atypical and sub-threshold variations of these disorders – a population frequently seen in eating disorder treatment clinics (Fairburn & Bohn, 2005).

The large sample size allowed for adequate power to detect group differences, while the use of several psychometrically supported questionnaires contributed to the validity of results. In addition, the study procedures allowed participants to remain completely anonymous, which may have resulted in greater self-disclosure of eating disorder psychopathology (Keel, Crow, Davis, & Mitchell, 2002). Efforts to recruit a demographically diverse sample using a variety of outreach methods were also noteworthy, with advertisements sent to several ethnic and gender diverse University of Minnesota student groups, Historically Black Colleges and Universities, and predominately Hispanic colleges. Additionally, efforts were made to post study

information on a male eating disorder website and advertisements were posted on Craig's List websites in large, metropolitan areas.

Despite efforts to recruit a demographically heterogeneous sample, the majority of participants identified as Caucasian, college-educated women, which is a profile that is readily observed in studies of eating disorders (Striegel-Moore et al., 2003). While it was anticipated that more women than men would participate in the study given that eating disorders disproportionately affect women over men (APA, 2013), findings would have extended to a broader population if there was more gender diversity, especially in the RED group. Unfortunately, the few individuals who identified as gender nonconforming were excluded from the study. The original intent was to include these individuals to better understand characteristics of this understudied sample but to due small sample size (n = 5), these individuals were ultimately excluded from study analyses. For the interested reader, Table 5 in Appendix C provides characteristics of this subsample.

Additionally, more than half of individuals who consented to the study were ineligible. This could be reduced if future studies examined emotion regulation and negative affect among individuals who exhibit infrequent eating disorder symptoms (e.g., one binge eating episode in the past three months) or who deny engagement in eating disorder behaviors but who continue to experience significant body dissatisfaction. The progression from an eating disorder to recovery is likely marked by periods of infrequent engagement in eating disorder behaviors and/or cognitions, and so a better understanding of this process would bridge the gap between what is known about individuals with active eating disorders and those in recovery from eating disorders.

The cross-sectional nature of this study sufficed for establishing group differences in emotion regulation and negative affect but did not allow for the study of changes in eating disorder psychopathology, emotion regulation, and negative affect over time. In addition, study participants were not separated on the basis of eating disorder diagnosis. While this may have influenced findings, the validity of such results would be compromised given that diagnostic migration between eating disorder categories is not uncommon (Milos et al., 2005). Study methodology did not capture more than one eating disorder diagnosis per person, and furthermore, modification of the EDDS (Stice et al., 2000) to obtain lifetime DSM-5 (APA, 2013) eating disorder diagnoses may have influenced findings as this measure was originally designed to capture DSM-IV (APA, 2000) current eating disorder diagnoses. Lastly, because the study was conducted entirely online, height and weight measurements, as well as eating disorder psychopathology that were used to establish diagnostic information and recovery status, were based entirely on participant self-report and may have been inaccurate in some cases.

**Implications for Practice and Future Research**

The current study established that emotion dysregulation and heightened negative affect characterize individuals with active eating disorders but not those in recovery from eating disorders. Replication studies are needed to support or refute these findings and would benefit from objective measurements of height and weight and interview-based, semi-structured assessments in order to establish eating disorder diagnoses. Future studies should aim to recruit demographically heterogeneous samples and may benefit from outreach efforts to diverse populations outside of college and university settings. Additionally, future studies should employ longitudinal designs that examine changes in

emotion regulation, negative affect, and eating disorder psychopathology from illness to recovery. Including a broader range of participants in such studies who are at different points in recovery would not only elucidate the recovery process but also potentially reduce participant exclusions.

Increased interest in delineating emotional deficits in eating disorders has contributed to the development of novel interventions that target emotion regulation deficits in this population (e.g., Integrative Cognitive Affective Therapy; Wonderlich et al., 2015). Accumulating evidence supports the use of emotion-focused interventions for the treatment of eating disorders; however, there is insufficient evidence to conclude these interventions are preferable over evidence-based treatments for eating disorders that do not directly target emotion regulation deficits (Safer et al., 2010; Wonderlich et al., 2014). Dismantling studies are thus needed to differentiate what aspects of the treatment experience produce the greatest improvements in emotion regulation (e.g., therapist characteristics, client expectations, specific techniques).

Implications for prevention and intervention are numerous. First, although the focus of this study was on emotion regulation and negative affect in eating disorders, these variables are significant to a range of psychiatric conditions that are frequently comorbid with eating disorders, including depression (Joormann & Gotlib, 2010), anxiety (Amstadter, 2008), substance use disorders (Berking et al., 2011), and borderline personality disorder (Glenn & Klonsky, 2009). Although the focus has been on treating eating disorders as a separate entity, interventions that simultaneously target a number of different conditions that are associated with impaired emotion regulation and heightened negative affected would be more cost-effective and, potentially more successful. The

Unified Protocol for Transdiagnostic Treatment of Emotional Disorders (Barlow et al., 2010) is an example of such an approach as its emphasis is on targeting emotion regulation deficits that underlie anxiety and depressive disorders.

Results of this study found that, consistent with previous research, individuals with eating disorders experience a range of emotion regulation deficits that undoubtedly infringe on quality of life. It is therefore recommended that professionals working with individuals with eating disorders identify areas of greatest need with regard to emotion regulation deficits and work collaboratively with clients to build emotion regulation skills that not only will reduce one's reliance on eating disorder behaviors, but will also build self-efficacy, distress tolerance, and confidence in one's ability to navigate emotions. Integrative Cognitive Affective Therapy (Wonderlich et al., 2015) and Dialectical Therapy for Binge Eating and BN (Safer et al., 2009) are two treatment manuals for eating disorders that include a range of interventions for emotion regulation deficits. The Unified Protocol for Transdiagnostic Treatment of Emotional Disorders (Barlow et al., 2010), while not specific to eating disorders, also details a number of excellent strategies to assist clients in reducing emotional avoidance. Additionally, providers can assist clients in improving emotion regulation by creating space in the therapeutic relationship for the identification and expression of a range of emotions that arise in the context of psychotherapy. Group formats offer additional opportunities for emotional exchanges between group members that promote healthy communication.

The study results not only have implications for the prevention of eating disorders, but also a myriad of other conditions and life stressors that are caused and/or exacerbated by poor emotion regulation and, relatedly, heightened negative affect. A

range of prevention efforts (e. g. psychoeducational interventions) may lead to improved emotion regulation in individuals susceptible to eating disorders, and can be delivered individually, in groups, and in larger systems (e.g., school districts). For instance, early childhood education programs may incorporate curriculum that educates parents about emotional health, provides concrete skills for modeling emotions to their children, and incorporates activities for children that provide exposure to a range of emotions. Middle school students identified as "at risk" for eating disorders (e.g., individuals with heightened body dissatisfaction) may participate in an emotion-focused group to better equip group members with skills to navigate distressing emotions. Incorporating strategies to decrease body dissatisfaction and combat media messages that reinforce the thin ideal, while simultaneously bolstering emotion regulation strategies, may be even more useful for at-risk populations. There is a prevention program designed for mothers with histories of eating disorders called Networking, Uniting, and Reaching out To Upgrade Relationships and Eating (i.e., NURTURE; Runfola et al., 2014) that includes a module on mastering emotions in addition to modules on feeding and eating, healthy body image, media exposure, and personality and parenting. Adaptations of this intervention may be useful for adolescents and those at risk for eating disorders without children. If future research provides evidence that emotion regulation is, indeed, a critical component of recovery from eating disorders, then finding methods to bolster emotion regulation in those of greatest need may reduce the development of eating disorders.

**Conclusions**

This study found significant differences in emotion regulation and negative affect between individuals with active eating disorders, individuals in recovery from eating

disorders, and individuals without histories of eating disorders who comprised a comparison sample. The AED group reported significantly greater emotion regulation deficits and heightened negative affect compared to the RED group and COMP group, who did not significantly differ from one another with regard to emotion regulation and negative affect. These findings indicate that emotion regulation deficits and heightened negative affect are characteristics of active eating disorders and that these features may improve along with eating disorder psychopathology, although longitudinal studies examining the temporal relationship between these variables are needed.

Results from this study add to the limited research literature on emotion regulation in eating disorder recovery because of the use of a diagnostically heterogeneous sample of sufficient size and comparison of a range of emotion regulation difficulties, and provide a base for future research to build upon. It is hoped that as research accumulates on this important topic, a better understanding of the roles that negative affect and emotion dysregulation play in the etiology, maintenance, and recovery from eating disorders will result in more effective prevention and intervention efforts.

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**Appendix A: IRB Approved Recruitment Materials**

# Study Participants Needed

Adults who have never had an eating disorder are invited to participate in a University of Minnesota doctoral student research study. This study involves completing a 10-15 minute online survey that includes questions about emotions and past or present eating-related concerns. Survey responses are anonymous.

If you are interested in this study, please go to the survey link. Alternatively, you can contact the doctoral student researcher, Nora Durkin, for more information at 612-625-1586 or umnedstudy@gmail.com.

**www.surveymonkey.com/r/edrecovery**

Eating Disorders Survey Study
www.surveymonkey.com/r/edrecovery
612-625-1586/ umnedstudy@gmail.com

# Have you ever had an eating disorder?

Adults with current or past eating disorders (e.g., anorexia, bulimia, binge eating, compulsive overeating) are invited to participate in a University of Minnesota doctoral student research study on eating disorder recovery that involves completing a 10-15 minute online survey.
Survey responses are anonymous.

If you are interested in this study, please go to the survey link. Alternatively, you can contact the doctoral student researcher, Nora Durkin, for more information at 612-625-1586 or umnedstudy@gmail.com.

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# Do you have a history of an eating disorder?

Adults with past eating disorders (e.g., anorexia, bulimia, binge eating, compulsive overeating) are invited to participate in a University of Minnesota doctoral student research study on eating disorder recovery that involves completing a 10-15 minute online survey.
Survey responses are anonymous.

If you are interested in this study, please go to the survey link. Alternatively, you can contact the doctoral student researcher, Nora Durkin, for more information at 612-625-1586 or umnedstudy@gmail.com.

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612-625-1586/ umnedstudy@gmail.com

# Eating Disorder Recovery Study

Adults with past eating disorders (e.g., anorexia, bulimia, binge eating, compulsive overeating) are invited to participate in a University of Minnesota doctoral student research study on eating disorder recovery that involves completing a 10-15 minute online survey.
Survey responses are anonymous.

If you are interested in this study, please go to the survey link. Alternatively, you can contact the doctoral student researcher, Nora Durkin, for more information at 612-625-1586 or umnedstudy@gmail.com.

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Eating Disorders Survey Study
www.surveymonkey.com/r/edrecovery
612-625-1586/ umnedstudy@gmail.com

**"Understanding Emotion Regulation in Eating Disorder Recovery"**
**Online Study Advertisements**

*Note: The following text will be posted to social networking sites, including Facebook and Twitter, as well as on various websites (e.g. Craig's List, National Eating Disorders Association, National Association for Anorexia Nervosa and Associated Disorders, National Association for Males with Eating Disorders, The Emily Program, University of Minnesota Center for Eating Disorders Research). No one will be individually targeted through these online advertisements.*

**Eating Disorder Samples Text:**

"Adults with current or past eating disorders (e.g., anorexia, bulimia, binge eating, compulsive overeating) are invited to participate in a University of Minnesota doctoral student research study on eating disorder recovery that involves completing a 10-15 minute online survey.
Survey responses are anonymous. If you are interested in this study, please go to the survey link: www.surveymonkey.com/r/edrecovery. Alternatively, you can contact the doctoral student researcher, Nora Durkin, for more information at 612-625-1586 or umnedstudy@gmail.com."

*The aforementioned advertisement will include one of the following titles:*

**"Have you ever had an eating disorder?"**
**"Eating Disorder Participants Needed"**
**"Eating Disorder Recovery Survey"**

**Comparison Group Text:**

*The advertisement below will include one of the following titles:*

**"Control Participants Needed for Online Survey"**
**"Interested in Research?"**
**"Online Survey Study"**
**"Study Participants Needed"**

"Adults who have never had an eating disorder are invited to participate in a University of Minnesota doctoral student research study. This study involves completing a 10-15 minute online survey that includes questions about emotions and past or present eating-related concerns. Survey responses are anonymous. If you are interested in this study, please go to the survey link: www.surveymonkey.com/r/edrecovery. Alternatively, you can contact the doctoral student researcher, Nora Durkin, for more information at 612-625-1586 or umnedstudy@gmail.com."

Version Date: 15Dec15

# Study Participants Needed

Adults who have never had an eating disorder are invited to participate in a University of Minnesota doctoral student research study. This study involves completing a 10-15 minute online survey that includes questions about emotions and past or present eating-related concerns. Survey responses are anonymous.

If you are interested in this study, please go to the survey link. Alternatively, you can contact the doctoral student researcher, Nora Durkin, for more information at 612-625-1586 or umnedstudy@gmail.com.

**www.surveymonkey.com/r/edrecovery**

Eating Disorders Survey Study
www.surveymonkey.com/r/edrecovery
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**Recruitment Letter Template #1**

*Note: This template will be used for mailing or emailing study information and recruitment materials (i.e., flyers, online advertisement text) to eating disorder treatment programs (e.g., The Emily Program), college offices, other organizations such as nonprofits, and practicing psychologists.*

Dear ___,

I am a doctoral candidate in the University of Minnesota's Counseling & Student Personnel Psychology program and am recruiting participants for my dissertation, which is examining emotion regulation and negative affect among individuals with current eating disorders, individuals who are in recovery from eating disorders, and individuals who have never had eating disorders. The objective of this project is to determine whether individuals in recovery from eating disorders continue to experience emotion regulation difficulties and elevated rates of negative affect.

Study participation entails completing several measures online, which in total takes approximately 10-15 minutes. Those who wish to participate and remain anonymous can complete the entire study online without disclosing any identifying information. However, there is a gift card drawing and so those who wish to enter this optional drawing will be required to disclose contact information. Any identifying information obtained for the gift card drawing will not be linked to survey responses.

I am hoping to recruit a diverse sample and would appreciate any help that you/your organization could provide in order to inform prospective participants with current or past eating disorders of this opportunity. Some ideas include: hanging the study flyer included with this mailing in or near your [CLINIC/COUNSELING/ORGANIZATION], passing along the study advertisement to [COLLEAGUES/MEMBERS OF YOUR ORGANIZATION] via email, and/or posting the study advertisement on your website/social media page(s). I would be happy to mail you colored flyers if you would prefer.

Thank you for your consideration. Please do not hesitate to contact me if you have any questions at 612-625-1586 or sand0692@umn.edu.

Best,

Nora Durkin, M.A.
Doctoral Candidate
Counseling & Student Personnel Psychology
University of Minnesota

Doctoral Adviser: Professor Emeritus John L. Romano, Ph.D.

**Recruitment Letter Template #2**

*Note: This template will be used for mailing or emailing study information and recruitment materials (i.e., flyers, online advertisement text) to student organizations, college offices, and nonprofit organizations.*

Dear ___,

I am a doctoral candidate in the University of Minnesota's Counseling & Student Personnel Psychology program and am recruiting participants for my dissertation. The topic of my dissertation is on eating disorders recovery and so I am hoping to recruit individuals with current eating disorders, those who are in recovery from eating disorders, and those who have never had eating disorders.

Study participation entails completing several measures online, which in total takes approximately 10-15 minutes. Those who wish to participate and remain anonymous can complete the entire study online without disclosing any identifying information. However, there is a gift card drawing and so those who wish to enter this optional drawing will be required to disclose contact information. Any identifying information obtained for the gift card drawing will not be linked to survey responses.

I am hoping to recruit a diverse sample and would appreciate any help that you/your organization could provide in order to inform individuals about this opportunity. Some ideas include: hanging the study flyer included with this mailing in or near your [ORGANIZATION], passing along study-related information to members of your [ORGANIZATION/STUDENT GROUP] by email, and/or posting the study advertisement on your website/social media page(s). I would be happy to mail you colored flyers if you would prefer.

Thank you for your consideration! Please do not hesitate to contact me if you have any questions at 612-625-1586 or sand0692@umn.edu. I would be more than happy to answer any questions and talk more about my study.

Best,

Nora Durkin, M.A.
Doctoral Candidate
Counseling & Student Personnel Psychology
University of Minnesota

Doctoral Adviser: Professor Emeritus John L. Romano, Ph.D.

## Appendix B: Study Measures

Demographics, Eating Disorder, and Treatment Questionnaire

*Instructions: Please mark the answer that best describes you. If you do not see a response that fits, please select "other" and describe (e.g., "I identify as transgender" or "I am a student who is also employed").*

1. Where did you hear about this study?
    a. Campus/community flyer
    b. Website (name of site: ___)
    c. Don't know
    d. Other (specify: ___)

2. Age: ___ years

3. Gender identity:
    a. Woman
    b. Man
    c. Other (specify: ___)

4. Racial identity:
    a. Caucasian
    b. Black American
    c. American Indian
    d. Asian American
    e. Hispanic/Latino
    f. International (specify: ___)
    g. Mixed Race (specify: ___)
    h. Other (specify: ___)

5. Primary role:
    a. Student
    b. Employed (non-student)
    c. Unemployed
    d. Other (specify: ___)

6. Highest education level completed:
    a. I did not graduate high school
    b. Completed high school / Obtained GED diploma
    c. Some college
    d. Graduated college (associate's degree)
    e. Graduated college (bachelor's degree)
    f. Some graduate/professional school
    g. Completed graduate/professional school

h. Other (specify: ___)

7. Have you ever had an eating disorder?
    a. Yes
    b. No → **skip to question 11**
    c. Don't know

8. At approximately what age did you begin to regularly engage in eating disorder behaviors (e.g., binge eating, self-induced vomiting, fasting) *and* feel very dissatisfied with your body shape or weight? Please give your best guess if you are unsure.
    a. __ years old

9. At approximately what age did you last regularly engage in eating disorder behaviors (e.g., binge eating, self-induced vomiting, fasting) *and* feel very dissatisfied with your body shape or weight? Please give your best guess if you are unsure. If this still applies, please list your current age.
    a. __ years old

10. Have you ever been diagnosed with an eating disorder?
    a. Yes
    b. No
    c. Don't know

11. What has been your lowest weight?
    a. ___ pounds

12. How tall were you at your lowest weight?
    a. ___ feet ___ inches

13. How old were you at your lowest weight?
    a. __ years old

14. What has been your highest weight?
    a. ___ pounds

15. How tall were you at your highest weight?
    a. ___ feet ___ inches

16. How old were you at your highest weight?
    a. __ years old

17. Have you ever received treatment for an eating disorder?
    a. Yes
    b. No → **Skip to question 22**

18. What type(s) of eating disorder treatment have you received? Check all that apply:
    a. Outpatient Individual Therapy
    b. Outpatient Group Therapy
    c. Intensive Outpatient Therapy / Day Treatment (e.g., participating in a program for several hours per day a number of times each week)
    d. Emergency Room Visits for Psychiatric Reasons
    e. Inpatient Treatment
    f. Residential Treatment
    g. Nutritional Counseling
    h. Medication Management (e.g., psychiatric medication such as antidepressants)
    i. Community Support Groups (e.g., Overeaters Anonymous)
    j. Other (specify: ___)

19. For how long have you been / were you in treatment for an eating disorder? If there were breaks between treatment episodes, please exclude time periods that you were not receiving treatment.
    a. Less than 1 month
    b. 1 to 5 months
    c. 6 to 11 months
    d. 12 months to 2 years
    e. More than 2 years but less than 5 years
    f. 5 years or more

20. In thinking about the treatment(s) you received, please rate the extent to which you found the following strategies helpful in treating your eating disorder.

| | Not helpful at all<br>1 | A little helpful<br>2 | Somewhat helpful<br>3 | Mostly helpful<br>4 | Extremely helpful<br>5 | I don't recall learning this<br>N/A |
|---|---|---|---|---|---|---|
| Learning about the importance of eating regular meals and snacks | | | | | | |
| Learning to challenge unhelpful/negative thoughts | | | | | | |
| Learning different ways to manage | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| relationships | | | | | | |
| Learning to identify emotions | | | | | | |
| Learning to tolerate negative emotions | | | | | | |
| Learning different ways of coping when I am tempted to use eating disorder behavior (e.g., going for a walk instead of binge eating) | | | | | | |
| Other (specify: ___) | | | | | | |

21. Are you *currently* in treatment for an eating disorder?
    a. Yes
    b. No

**Only those who have not received ED treatment answer item #22:**

22. What prevented you from seeking eating disorder treatment? Check all that apply:
    a. I have no history of an eating disorder
    b. I did not have access to treatment / treatment was not available where I lived
    c. I felt too ashamed or embarrassed, and/or was too worried about what others would think of me
    d. I did not think I needed eating disorder treatment and/or I did not want treatment
    e. I did not think treatment would help me
    f. Other (specify: ___)

23. Have you ever received psychological treatment (e.g., counseling or therapy) for any other issues related to your mental health and well-being?
    g. No → **skip to question 26**
    h. Yes

24. For how long have you been / were you in treatment for non-eating disorder issues? If there were breaks between treatment episodes, please exclude time periods that you were not receiving treatment.
        i. Less than 1 month
        ii. 1 to 5 months
        iii. 6 to 11 months

iv. 12 months to 2 years
v. More than 2 years but less than 5 years
vi. 5 years or more

25. Are you *currently* receiving psychological treatment for any non-eating disorder issues (e.g., concerns related to mood, relationships, identity)?
    a. Yes
    b. No

26. Are you *currently* taking any psychiatric medication (e.g., antidepressants)?
    a. Yes
    b. No

Difficulties in Emotion Regulation Scale (DERS)

*Instructions: Please indicate how often the following statements apply to you by choosing the appropriate time percentage for each statement.*

| | Almost never (0-10%) | Some of the time (11-35%) | About half the time (36-65%) | Most of the time (66-90%) | Almost always (91-100%) |
|---|---|---|---|---|---|
| 1. I am clear about my feelings | 1 | 2 | 3 | 4 | 5 |
| 2. I pay attention to how I feel | 1 | 2 | 3 | 4 | 5 |
| 3. I experience my emotions as overwhelming and out of control | 1 | 2 | 3 | 4 | 5 |
| 4. I have no idea how I am feeling | 1 | 2 | 3 | 4 | 5 |
| 5. I have difficulty making sense out of my feelings | 1 | 2 | 3 | 4 | 5 |
| 6. I am attentive to my feelings | 1 | 2 | 3 | 4 | 5 |
| 7. I know exactly how I am feeling | 1 | 2 | 3 | 4 | 5 |
| 8. I care about what I am feeling | 1 | 2 | 3 | 4 | 5 |
| 9. I am confused about how I feel | 1 | 2 | 3 | 4 | 5 |
| 10. When I'm upset, I acknowledge my emotions | 1 | 2 | 3 | 4 | 5 |
| 11. When I'm upset, I become angry with myself for feeling that way | 1 | 2 | 3 | 4 | 5 |
| 12. When I'm upset, I become embarrassed for feeling that way | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| 13. When I'm upset, I have difficulty getting work done | 1 | 2 | 3 | 4 | 5 |
| 14. When I'm upset, I become out of control | 1 | 2 | 3 | 4 | 5 |
| 15. When I'm upset, I believe that I will remain that way for a long time | 1 | 2 | 3 | 4 | 5 |
| 16. When I'm upset, I believe that I'll end up feeling very depressed | 1 | 2 | 3 | 4 | 5 |
| 17. When I'm upset, I believe that my feelings are valid and important | 1 | 2 | 3 | 4 | 5 |
| 18. When I'm upset, I have difficulty focusing on other things | 1 | 2 | 3 | 4 | 5 |
| 19. When I'm upset, I feel out of control | 1 | 2 | 3 | 4 | 5 |
| 20. When I'm upset I can still get things done | 1 | 2 | 3 | 4 | 5 |
| 21. When I'm upset, I feel ashamed with myself for feeling that way | 1 | 2 | 3 | 4 | 5 |
| 22. When I'm upset, I know that I can find a way to eventually feel better | 1 | 2 | 3 | 4 | 5 |
| 23. When I'm upset, I feel like I am weak | 1 | 2 | 3 | 4 | 5 |
| 24. When I'm upset, I feel like I can remain in control of my behaviors | 1 | 2 | 3 | 4 | 5 |
| 25. When I'm upset, I feel guilty for feeling that way | 1 | 2 | 3 | 4 | 5 |
| 26. When I'm upset, I have difficulty concentrating | 1 | 2 | 3 | 4 | 5 |
| 27. When I'm upset, I have difficulty controlling my behaviors | 1 | 2 | 3 | 4 | 5 |
| 28. When I'm upset, I believe there is nothing I can do to make myself feel better | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| 29. When I'm upset, I become irritated with myself for feeling that way | 1 | 2 | 3 | 4 | 5 |
| 30. When I'm upset, I start to feel very bad about myself | 1 | 2 | 3 | 4 | 5 |
| 31. When I'm upset, I believe that wallowing in it is all that I can do | 1 | 2 | 3 | 4 | 5 |
| 32. When I'm upset, I lose control over my behaviors | 1 | 2 | 3 | 4 | 5 |
| 33. When I'm upset, I have difficulty thinking about anything else | 1 | 2 | 3 | 4 | 5 |
| 34. When I'm upset, I take time to figure out what I'm really feeling | 1 | 2 | 3 | 4 | 5 |
| 35. When I'm upset, it takes me a long time to feel better | 1 | 2 | 3 | 4 | 5 |
| 36. When I'm upset, my emotions feel overwhelming | 1 | 2 | 3 | 4 | 5 |

Eating Disorders Diagnostic Scale (EDDS)

*Instructions: Please carefully complete all questions based on the three month time period during which your eating disorder symptoms were at their worst. If you have never had an eating disorder, please answer these questions with the previous three months in mind.*

**During that 3 month time period…**

| | Not at all | | Slightly | | Moderately | | Extremely |
|---|---|---|---|---|---|---|---|
| 1. Did you feel fat? | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. Did you have a definite fear that you might gain weight or become fat? | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Did your weight influence how you think about (judge) yourself as a person? | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. Did your shape influence how you think about (judge) yourself as a person? | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

5. During that **3 month time period** were there times when you felt you had eaten what other people would regard as an unusually large amount of food (e.g., a quart of ice cream) given the circumstances?

YES NO

6. During the times when you at an unusually large amount of food, did you experience a loss of control (feel you couldn't stop eating or control what or how much you were eating)?

YES NO

7. How many **times per week** on average over that **3 month time period** did you eat an unusually large amount of food and experience a loss of control?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

**During these episodes of overeating and loss of control did you…**

8. Eat much more rapidly than normal?

YES NO

9. Eat until you felt uncomfortably full?
YES NO

10. Eat large amounts of food when you didn't feel physically hungry?
YES NO

11. Eat alone because you were embarrassed by how much you were eating?
YES NO

12. Feel disgusted with yourself, depressed, or very guilty after eating?
YES NO

13. Feel very upset about your uncontrollable overeating or resulting weight gain?
YES NO

---

14. How many **times per week** on average over that **3 month time period** did you make yourself vomit to prevent weight gain or counteract the effects of eating?
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

15. How many **times per week** on average over that **3 month time period** did you use laxatives or diuretics to prevent weight gain or counteract the effects of eating?
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

16. How many **times per week** on average over that **3 month time period** did you fast (skipped at least 2 meals in a row) to prevent weight gain or counteract the effects of eating?
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

17. How many **times per week** on average over that **3 month time period** did you engage in excessive exercise specifically to counteract the effects of overeating episodes?
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

---

18. How much did you weigh, on average, during that 3 month time period? If uncertain, please give your best estimate.
___ pounds

19. How tall were you during that 3 month time period? If uncertain, please give your best estimate.
___ feet ___ inches

20. How old were you during that 3 month time period?
___ years old

Eating Disorder Examination – Questionnaire (EDE-Q)

**EATING QUESTIONNAIRE**

**Instructions: The following questions are concerned with the past four weeks (28 days) only. Please read each question carefully. Please answer all the questions. Thank you.**

**Questions 1 to 12: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days) only.**

.

| | On how many of the past 28 days ….. | No days | 1-5 days | 6-12 days | 13-15 days | 16-22 days | 23-27 days | Every day |
|---|---|---|---|---|---|---|---|---|
| 1 | Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 2 | Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 3 | Have you tried to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 4 | Have you tried to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 5 | Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 6 | Have you had a definite desire to have a totally flat stomach? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | Has thinking about food, eating or calories made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 8 | Has thinking about shape or weight made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 9 | Have you had a definite fear of losing control over eating? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 10 | Have you had a definite fear that you might gain weight? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 11 | Have you felt fat? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 12 | Have you had a strong desire to lose weight? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |

**Questions 13-18: Please fill in the appropriate number in the boxes on the right. Remember that the questions only refer to the past four weeks (28 days).**

**Over the past four weeks (28 days) ……**

| | |
|---|---|
| 13 Over the past 28 days, how many times have you eaten what other people would regard as an unusually large amount of food (given the circumstances)? | ..... |
| 14 ….. On how many of these times did you have a sense of having lost control over your eating (at the time that you were eating)? | ..... |
| 15 Over the past 28 days, on how many **DAYS** have such episodes of overeating occurred (i.e., you have eaten an unusually large amount of food and have had a sense of loss of control at the time)? | ..... |
| 16 Over the past 28 days, how many times have you made yourself sick (vomit) as a means of controlling your shape or weight? | ..... |
| 17 Over the past 28 days, how many times have you taken laxatives as a means of controlling your shape or weight? | ..... |
| 18 Over the past 28 days, how many times have you exercised in a "driven" or "compulsive" way as a means of controlling your weight, shape or amount of fat, or to burn off calories? | ..... |

**Questions 19 to 21: Please circle the appropriate number. Please note that for these questions the term "binge eating" means eating what others would regard as an unusually large amount of food for the circumstances, accompanied by a sense of having lost control over eating.**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 19 Over the past 28 days, on how many days have you eaten in secret (ie, furtively)? ….. Do not count episodes of binge eating | No days | 1-5 days | 6-12 days | 13-15 days | 16-22 days | 23-27 days | Every day |
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 20 On what proportion of the times that you have eaten have you felt guilty (felt that you've done wrong) because of its effect on your shape or weight? ….. Do not count episodes of binge eating | None of the times | A few of the times | Less than half | Half of the times | More than half | Most of the time | Every time |
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 21 Over the past 28 days, how concerned have you been about other people seeing you eat? ….. Do not count episodes of binge eating | Not at all | | Slightly | | Moderately | | Markedly |
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 |

Questions 22 to 28: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days).

| | **Over the past 28 days …..** | **Not at all** | | **Slightly** | | **Moderate -ly** | | **Markedly** |
|---|---|---|---|---|---|---|---|---|
| 22 | Has your weight influenced how you think about (judge) yourself as a person? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 23 | Has your shape influenced how you think about (judge) yourself as a person? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 24 | How much would it have upset you if you had been asked to weigh yourself once a week (no more, or less, often) for the next four weeks? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 25 | How dissatisfied have you been with your weight? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 26 | How dissatisfied have you been with your shape? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 27 | How uncomfortable have you felt seeing your body (for example, seeing your shape in the mirror, in a shop window reflection, while undressing or taking a bath or shower)? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 28 | How uncomfortable have you felt about others seeing your shape or figure (for example, in communal changing rooms, when swimming, or wearing tight clothes)? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |

What is your weight at present? (Please give your best estimate.) .....

What is your height? (Please give your best estimate.) .....

If female: Over the past three-to-four months have you missed any menstrual periods? .....

If so, how many? .....

Have you been taking the "pill"? .....

**THANK YOU**

## Emotion Regulation Questionnaire (ERQ)

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

**1----------2----------3----------4----------5----------6----------7**
**strongly disagree** — **neutral** — **strongly agree**

1. ____ When I want to feel more *positive* emotion (such as joy or amusement), I *change what I'm thinking about.*
2. ____ I keep my emotions to myself.
3. ____ When I want to feel less *negative* emotion (such as sadness or anger), I *change what I'm thinking about.*
4. ____ When I am feeling *positive* emotions, I am careful not to express them.
5. ____ When I'm faced with a stressful situation, I make myself *think about it* in a way that helps me stay calm.
6. ____ I control my emotions by *not expressing them.*
7. ____ When I want to feel more *positive* emotion, I *change the way I'm thinking* about the situation.
8. ____ I control my emotions by *changing the way I think* about the situation I'm in.
9. ____ When I am feeling *negative* emotions, I make sure not to express them.
10. ____ When I want to feel less *negative* emotion, I *change the way I'm thinking* about the situation.

**Note**

Do not change item order, as items 1 and 3 at the beginning of the questionnaire define the terms "positive emotion" and "negative emotion".

**Scoring (no reversals)**

Reappraisal Items: 1, 3, 5, 7, 8, 10; Suppression Items: 2, 4, 6, 9.

Positive and Negative Affect Scale – Expanded Form (PANAS-X)

**Instructions:** This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer. Indicate to what extent you have felt this way ***over the past few weeks***.

| | Very slightly or not at all | A little | Moderate-ly | Quite a bit | Extreme-ly |
|---|---|---|---|---|---|
| 1. cheerful | 1 | 2 | 3 | 4 | 5 |
| 2. disgusted | 1 | 2 | 3 | 4 | 5 |
| 3. attentive | 1 | 2 | 3 | 4 | 5 |
| 4. daring | 1 | 2 | 3 | 4 | 5 |
| 5. scornful | 1 | 2 | 3 | 4 | 5 |
| 6. irritable | 1 | 2 | 3 | 4 | 5 |
| 7. delighted | 1 | 2 | 3 | 4 | 5 |
| 8. fearless | 1 | 2 | 3 | 4 | 5 |
| 9. disgusted with self | 1 | 2 | 3 | 4 | 5 |
| 10. sad | 1 | 2 | 3 | 4 | 5 |
| 11. afraid | 1 | 2 | 3 | 4 | 5 |
| 12. shaky | 1 | 2 | 3 | 4 | 5 |
| 13. happy | 1 | 2 | 3 | 4 | 5 |
| 14. alone | 1 | 2 | 3 | 4 | 5 |
| 15. alert | 1 | 2 | 3 | 4 | 5 |
| 16. bold | 1 | 2 | 3 | 4 | 5 |
| 17. blue | 1 | 2 | 3 | 4 | 5 |
| 18. guilty | 1 | 2 | 3 | 4 | 5 |
| 19. joyful | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| 20. nervous | 1 | 2 | 3 | 4 | 5 |
| 21. lonely | 1 | 2 | 3 | 4 | 5 |
| 22. excited | 1 | 2 | 3 | 4 | 5 |
| 23. hostile | 1 | 2 | 3 | 4 | 5 |
| 24. proud | 1 | 2 | 3 | 4 | 5 |
| 25. jittery | 1 | 2 | 3 | 4 | 5 |
| 26. lively | 1 | 2 | 3 | 4 | 5 |
| 27. ashamed | 1 | 2 | 3 | 4 | 5 |
| 28. scared | 1 | 2 | 3 | 4 | 5 |
| 29. angry at self | 1 | 2 | 3 | 4 | 5 |
| 30. enthusiastic | 1 | 2 | 3 | 4 | 5 |
| 31. downhearted | 1 | 2 | 3 | 4 | 5 |
| 32. blameworthy | 1 | 2 | 3 | 4 | 5 |
| 33. determined | 1 | 2 | 3 | 4 | 5 |
| 34. frightened | 1 | 2 | 3 | 4 | 5 |
| 35. loathing | 1 | 2 | 3 | 4 | 5 |
| 36. confident | 1 | 2 | 3 | 4 | 5 |
| 37. energetic | 1 | 2 | 3 | 4 | 5 |
| 38. concentrating | 1 | 2 | 3 | 4 | 5 |
| 39. dissatisfied with self | 1 | 2 | 3 | 4 | 5 |

## Appendix C: Gender Nonconforming Sample Characteristics

Table 5

*Descriptive Characteristics of Gender Nonconforming Participants*.

| | Participant | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Gender Specifier | Transgender | Genderqueer | Agender | Genderqueer | Nonbinary |
| Age | 31 | 18 | 31 | 23 | 19 |
| EDDS diagnosis | 1 | 2 | 2 | 4 | 4 |
| DERS | | | | | |
| Total score | 137 | 152 | 115 | 153 | 132 |
| Nonacceptance | 30 | 22 | 19 | 30 | 23 |
| Goals | 23 | 20 | 18 | 23 | 24 |
| Impulse | 23 | 25 | 15 | 25 | 19 |
| Awareness | 18 | 27 | 25 | 24 | 18 |
| Strategies | 28 | 35 | 23 | 37 | 31 |
| Clarity | 15 | 23 | 15 | 14 | 17 |
| ERQ | | | | | |
| Reappraisal | 3.17 | 3.33 | 4.33 | 4.33 | 3.33 |
| Suppression | 5 | 5.25 | 5.75 | 4 | 4.25 |
| PANAS-X | | | | | |
| Negative Affect | 4.75 | 3.63 | 1.63 | 2.5 | 2.75 |
| Fear | 4.67 | 3.33 | 1.67 | 2.17 | 2.83 |
| Guilt | 4.8 | 3.6 | 1 | 1 | 1.8 |
| Hostility | 5 | 4.5 | 2.33 | 2.83 | 4.17 |
| Sadness | 3.8 | 3.8 | 2.2 | 1 | 4 |

*Note*. All five participants met criteria for the Active Eating Disorder group; DERS = Difficulties in Emotion Regulation Scale; EDDS = Eating Disorder Diagnostic Scale; ERQ = Emotion Regulation Questionnaire; PANAS-X = Positive and Negative Affect Scale – Expanded Version.